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Roll Back
Malaria

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Over recent decades, the explosive spread of malaria has given the world a few close calls. More than 20 per cent of the world's population is affected by this ancient and deadly disease. Unexpected epidemics have affected countries that had been free of malaria. Humanitarian crisis and massive population movements have led to excessive suffering and death. In much of the world – especially in tropical Africa – continuous malaria transmission leads to hundreds of thousands of child deaths each year. This overwhelms national health services, sustains poverty and disempowers societies.

Effective malaria control has led to dramatic declines in malaria deaths in several South East and Central Asian, as well as some African countries. Nevertheless, the consequences of hundreds of millions of cases of malaria each year still remain devastating and distressing for all and death rates are on the increase in Africa.

There is, though, real potential for progress in reducing people's malaria burdens. Low-cost tools have been developed to reduce the poverty and suffering caused by malaria. This collection of reports indicates how coordinated and focussed action can lead to real progress in rolling back malaria. Communities have succeeded when there is strong political backing at the highest level, a health system that can deliver services to people who need them, public demand for action and resources to enable access to necessary malaria control tools.

- In Vietnam, a six-year onslaught on malaria succeeded in reducing malaria deaths by 97 per cent and malaria cases by 59 per cent.
- In war-torn Sudan, negotiations among warring factions ensure that drugs and insecticide-treated nets reach those in need.
- An impressive and dramatic decline in death rates and disease incidence was achieved in Oman, with efforts to eradicate malaria from endemic regions and ensure rapid treatment of imported cases.
- In Tanzania, successful efforts to manufacture and market insecticide-treated nets have served as a model for similar enterprises in other countries.

The experiences reported show how this approach to malaria control can yield impressive results; the challenge now is to deliver the promise of the past progress – to massively increase the number of people who benefit from actions to roll back malaria.

DAVID NABARRO
Project Manager
Roll Back Malaria

March 2000



MALARIA - A WORLDWIDE CRISIS

GLOBAL TURNING POINT

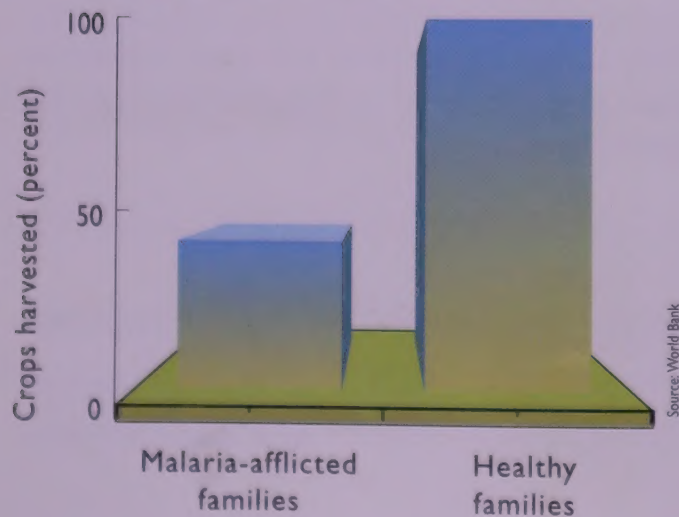
MALARIA IS one of humanity's worst diseases. Each year it kills more than a million people, many of whom need not die. The majority of victims are children under five who die because they are unprotected and are not treated quickly enough to prevent the disease killing them.

MALARIA SUFFERING is now a global crisis: one-fifth of the world's population is at risk and there are more than 300 million cases of malarial illness each year. Nine out of ten cases occur in Africa south of the Sahara. Malaria in pregnancy is widespread; it endangers the health of women and

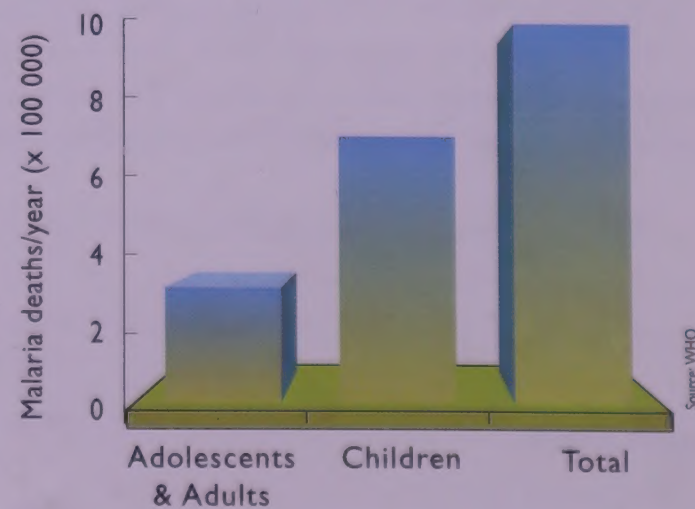
prospects for the newborn.

THE DISEASE CONTINUES TO spread due to a combination of factors: weak health systems; large population movements; deteriorating sanitation; climatic changes; spreading drug resistance; and in certain cases, uncontrolled development activities. Areas until recently considered malaria-free are now suffering death and social devastation due to an increase in epidemics and outbreaks. In many countries the workforce's productivity is reduced due to illness while the cost of disease control cripples the economies of poor countries.

LOSS OF PRODUCTIVITY



MALARIA DEATHS EACH YEAR



*P*ROMISE FOR PROGRESS

AND YET, this global devastation can be prevented. The world is at a turning point: never before has it had the means to roll back malaria. Never before have so many agreed to work together to devise effective strategies to combat the effects of the disease, to alleviate malaria-induced poverty and to reduce the suffering of those who are its victims. The movement to fight the disease is backed by a global partnership of governments, development agencies and banks, research groups, the private sector and ordinary men and women around the world. Progress to Roll Back Malaria (RBM) is based on collective strategies and actions that aim to reduce malaria suffering and death and to alleviate poverty made worse by the disease. And RBM's promise is to halve the world's malaria burden by the year 2010.

THERE IS little disagreement that better use of existing tools to fight malaria – such as wider use of insecticide-treated bednets or prompt and effective treatment of people's malarial illness – will lead to a substantial and sustainable progress. The promise to halve the world's malaria burden by 2010 is achievable.

BUT NOW, THE greatest challenge

countries and communities face is the vicious circle that links malaria and poverty. Poverty breeds malaria and malaria impoverishes people and societies. By conducting a well coordinated battle against malaria, major obstacles to development are removed. Where there are significant improvements in the health of communities and the workforce, economic and social conditions often improve along with economic output.

NOW IS THE TIME for governments, development agencies, the private sector and the research community to join together and help RBM make further progress.



STORIES OF *Hope*

FROM KENYA to Cambodia millions of children and adults are already benefiting from interventions that stop the deadly cycle of malaria. Some of these, such as bednets, the spraying of homes and marshlands or the use of antimalarial medicines, have been used for decades.

OTHER METHODS are new and facilitate rapid diagnosis and more effective treatment of the disease or help predict epidemics. Other new methods aim to strengthen health services and involve working with other sectors, such as the private sector, that are affected by the impact of malaria.

IN THESE PAGES you will read stories of hope, inspiring examples of how all these methods can combine to roll back malaria. You will realise that much more can be achieved with the backing of this exciting global partnership.

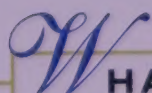
ROLL BACK MALARIA is committed to making a real difference in the lives of millions of men, women and children across the continents for whom Roll Back Malaria is much more than a movement. Your involvement is crucial to help sustain progress and realise the promise to halve malaria deaths by the year 2010.





ROLL BACK MALARIA —

WORLDWIDE PROGRESS



HAT IS THE ROLL BACK MALARIA MOVEMENT?

ROLL BACK MALARIA is a partnership working world-wide to halve the burden of malaria by 2010. The challenges are enormous but so are the rewards: saving lives, reducing poverty, boosting school attendance, and making life better for millions of people living in poor countries, especially in Africa.

THE WORK of Roll Back Malaria builds on previous experience and existing malaria control efforts in 15 African states, 11 Middle and Near East countries, seven Far Eastern countries and some nine American states. It has grown in response to government concerns in more than 30 countries and poorest communities.

THE MOVEMENT depends on up-to-date technical systems and expertise – for surveillance, for controlling mosquitoes, for using effective medicines, for integrated management of childhood illnesses (IMCI) and for encouraging the development of new diagnostic, treatment and preventive measures.

MAXIMUM EMPHASIS is given to results and to ensuring that malaria suffering and deaths are reduced. This requires concerted and coordinated action by a broad range of private and public sector organisations at all levels of society. RBM helps countries to develop such actions where they are needed and across a range of sectors (education, agriculture and environment).

PEOPLE, especially children and pregnant women, are at the centre of the RBM movement. The movement aims to secure a 30-fold expansion in the proportion of people who can get effective treatment, ideally within two hours' travel of the onset of symptoms, and in those who use treated bednets. It also seeks to reinforce links with interventions such as the IMCI initiative to reduce children's deaths from malaria. RBM supports a 30-fold increase in the proportion of children and pregnant women at risk who receive effective malaria protection.

SIX ELEMENTS OF ACTION TO ROLL BACK MALARIA

RBM'S SIX CRITICAL ELEMENTS WORK TOGETHER TO HELP BREAK THE CYCLE OF MALARIA TRANSMISSION, CURE PATIENTS AND SUPPORT DEVELOPMENT.

THE ELEMENTS ARE:



Evidence-based decisions using surveillance, appropriate response and building community awareness.

Rapid diagnosis and treatment supporting home care, direct access to effective medicines and wide availability of health services.



Multiple prevention using insecticide-treated nets, environmental management to control mosquitoes and making pregnancy safer.

Focussed research to develop new medicines, vaccines and safe insecticides.



Well-coordinated action for strengthening existing health services, policies and providing technical support.

Harmonised action to build a dynamic global movement.





GOVERNMENT COMMITMENT TO COORDINATED ACTION

GOVERNMENTS' HEALTH POLICIES ALLOCATE SUFFICIENT RESOURCES TO ROLL BACK MALARIA. WELL-COORDINATED ACTION CAN MAKE A DIFFERENCE.

THE *W*ILL TO SUCCEED

VIET NAM

IN VIET NAM, as in other South East Asian developing nations, malaria occurs mainly in forested and hilly areas. The disease also occurs along the rivers of the Mekong Delta, which are filled with brackish water. Over one third of Viet Nam's 77 million citizens live in rural communities and villages where malaria is endemic or there is a risk of epidemics.

WHAT SETS VIET NAM apart from its neighbours is the country's success in controlling malaria. Health professionals are firm believers that this success is not unique but rather evidence that any country can implement effective malaria control programmes if there is strong government commitment, good organisation and adequate investments. Control can succeed in spite of adverse environmental settings and serious drug resistance to antimalarials.

PEOPLE STILL REMEMBER the epidemics

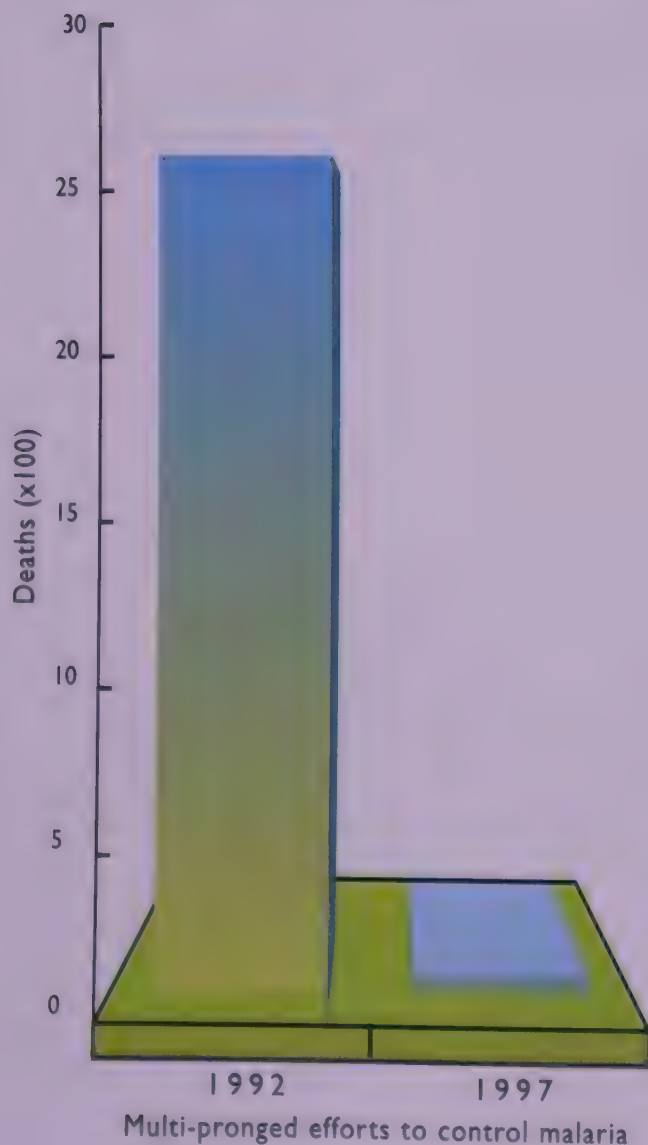
of 1991/92 during which more than two million people were affected by malaria and nearly 7,500 died. In 1991 alone 144 epidemics were recorded. A six-year onslaught on malaria succeeded in reducing malaria deaths by 97 per cent – with 152 in 1997 – and



malaria cases by 59 per cent. Malaria epidemics have declined by 92 per cent with only 11 small outbreaks recorded in 1997.

MALARIA CONTROL EFFORTS were

REDUCING DEATHS IN VIET NAM



Source: National Malaria Control Programme, Viet Nam

intensified in 1991. They have achieved a reduction in the number of deaths, severe cases of malaria and malaria illness, but so far have failed to control transmission on a large scale.

SEVERAL FACTORS have contributed towards Viet Nam's early success. During the early '90s the country's malaria control programme was identified as a national health priority. With decisive action and strong political will, funds were allocated towards malaria control, health care services were strengthened and revitalised down to the village level. Gradually, over the ensuing years, successful decentralisation of malaria control efforts took place.

PRODUCTION and use of new anti-malarials such as artemisinin and its derivatives was stepped up. Collaboration between industry and researchers led to the local production of artemisinin and related drugs for the treatment of multi-resistant and severe malaria. The artemisinin drugs used for centuries in traditional Chinese and Vietnamese medicine had been rediscovered by Chinese scientists in the 1970s. In Viet Nam the new drugs were provided to thousands of patients across the country. The extended availability and accessibility of

artemisinin was possibly the most important determining factor in the reduction of deaths and severe cases.

FROM 1995 ONWARDS insecticides in the residual synthetic group of environmentally-friendly pyrethroids were introduced. They were used for impregnating bednets and house-spraying. The impregnation of bednets was provided as a free service to people living in malaria endemic areas and nearly ten million people are now protected by this method. Ongoing trials in Viet Nam have shown that the effectiveness of treated bednets for preventing malaria is comparable to that of spraying houses with insecticides.

A NATIONAL EVALUATION of malaria control in 1995 showed that malaria had decreased in most areas where impregnated bednets had been introduced, but not in all of them. Where the use of bednets had been ineffective it was often found that the people did not know that the nets were for their protection against malaria. Obviously more community education is required to ensure proper bednet usage.

ANOTHER MALARIA control activity has been the strengthening of grassroots activities. Hamlet health care networks were introduced

for early detection, diagnosis and treatment. Local microscopists were trained and new equipment was installed. District mobile teams were organised to supervise health workers in selected areas with endemic malaria.

SOCIALISATION OF MALARIA control also paid off. Both the government and its foreign partners encouraged communities, civilian groups and volunteers to participate. Impregnated nets, insecticides and medicines were given free to the poor and to ethnic minorities. Training health volunteers and educating the public were instrumental to the





programme's success. Finally, epidemiological activities such as surveillance, epidemic forecasting, analysis and epidemiological stratification were strengthened.

EXPERIENCES over the last nine years have highlighted a number of interventions that have contributed to the reduction of malaria in the country. While Vietnamese achievements in malaria control are promising, setbacks have not been uncommon. Through trial and error lessons have been learned that can pave the way for sustained future success.

*Information obtained from
the National Malaria Control Programme, Viet Nam*



OMAN'S DIVERSE geography, with its relatively humid climate in some areas, permits the proliferation of malaria mosquitoes. This, coupled with a massive influx of imported malaria from the Indian subcontinent and East Africa, once made this small Arab nation a significant reservoir for the disease. The country's only hope, a national malaria control programme in the mid-70s, was plagued by an ever-increasing influx of immigrants with malaria, lack of coordinated control activities and rising resistance to antimalarials and insecticides. Malaria remained the number one health problem during the early '80s when there were about 300,000 clinical cases each year, most of them due to the killer species *Plasmodium falciparum*.

DESPITE THE COUNTRY'S high endemicity the relatively few mosquito breeding places could, however, be controlled with sufficient funds and access to a good infrastructure. Geographically, Oman is rather like an island, with sea to the north, east and south and desert to the west. This suggests that if malaria transmission could be halted it would be possible to protect against importation from abroad.

IN 1991 teams of doctors, health workers, laboratory technicians, social workers and community volunteers joined an impressive pilot project aiming to eradicate the disease from the Sharqiya region and then extend to other regions. The ultimate goal was eradication by the year 2000. The project was supported by Oman's progressive leader.

BACKED BY THE GOVERNMENT and supported by malaria experts, control teams made an extensive inventory of all breeding sites and destroyed mosquitoes by weekly spraying with insecticides. Meanwhile, malaria control was pursued through the existing health infrastructure which detected, diagnosed and treated the disease. This helped prevent further outbreaks.

FROM 1996 ONWARDS, the early detection and treatment of malaria cases was strengthened by involving private clinics, hospitals and institutes. A new malaria case notification system was put into practice which required that notification be made within one to 24 hours. To tackle malaria importation a malaria screening centre was set up at Seeb international airport.

COMMUNITY PARTICIPATION was also pursued, mainly by educating the public and



training health volunteers. Similarly, intersectoral collaboration was sought to enlist expertise that could contribute towards eradication.

THE COUNTRY'S EFFORTS have paid off and all indicators point to a great success. During the period January to August 1999 there were only 555 cases, of which only 13 were of local origin. Oman continues to experience heavy importation of malaria but has an effective system in place to detect and treat imported cases. Reported annual savings following eradication are US\$ 2.1 million due to the reduced number of hospitalised malaria cases. Tourism has also flourished.

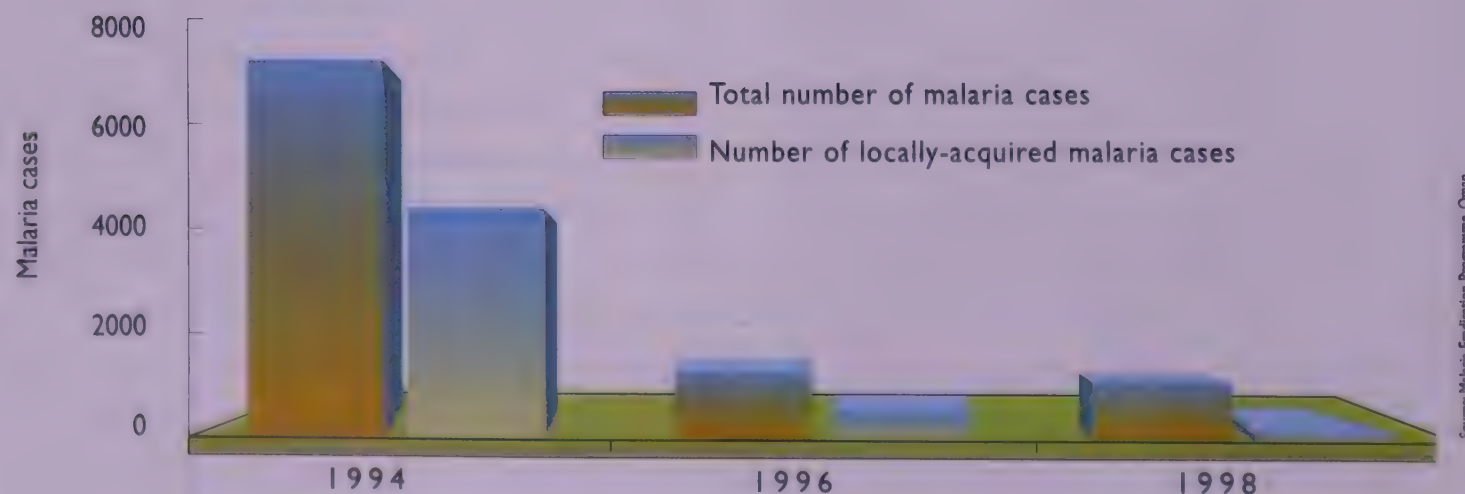
OMAN AND the United Arab Emirates have also managed to set an excellent example of bilateral cooperation. In view of

the transparency of their shared border, synchronisation of activities is essential. Both countries, which are aiming for complete interruption of transmission and elimination of the reservoir of infectious malaria cases have now initiated quarterly Joint Entomological Surveys at the borders. The first were implemented in the first and second quarters of 1999 in Musandam (Oman) and Ras-al-Khalma (UAE).

THE STRENGTHS of Oman's national programme include leadership support and massive resources. Both are maintained and the country is finalising an agreement to join the Roll Back Malaria partnership.

*Information obtained from Mohammad Ali Khalifa,
Malaria Eradication Programme, Oman*

IMPACT OF MALARIA ERADICATION IN OMAN



ONE OF THE RISKS faced by malaria control programmes is the possibility that war or civil unrest will lead to a lapse in antimalarial measures and that malaria will sweep through a population that has lost its immunity during years of low transmission.

THIS WAS THE CASE in Tajikistan where malaria had been virtually eliminated by 1960 with only a few imported cases in the southern districts bordering Afghanistan. Changes in the country's political structure and the departure of Soviet doctors and specialists in 1980 led to an increase in malaria, although it was contained by a major control effort including aerial spraying and mass chemoprophylaxis. Until 1992 malaria incidence was kept to around 200-300 cases a year with between 44 and 77 per cent of these in the border districts.

HOWEVER, intense fighting and refugee movement during the 1992-95 civil war produced a disastrous situation, one of the worst effects of which was the breakdown of the country's health systems.

MEDICINES AND EQUIPMENT were in short supply and lack of on-going training meant that laboratory staff and physicians



lacked modern technical skills and knowledge. By 1997 recorded malaria cases in Tajikistan had risen to 30,000, chiefly in areas disrupted by refugees returning from Afghanistan, almost all of whom had, or had just recovered from malaria.

CONSCIOUS OF THE DANGER of an epidemic spreading throughout the country, and backed by a massive international assistance package, the government of Tajikistan developed a national tropical diseases control programme in 1997 which,

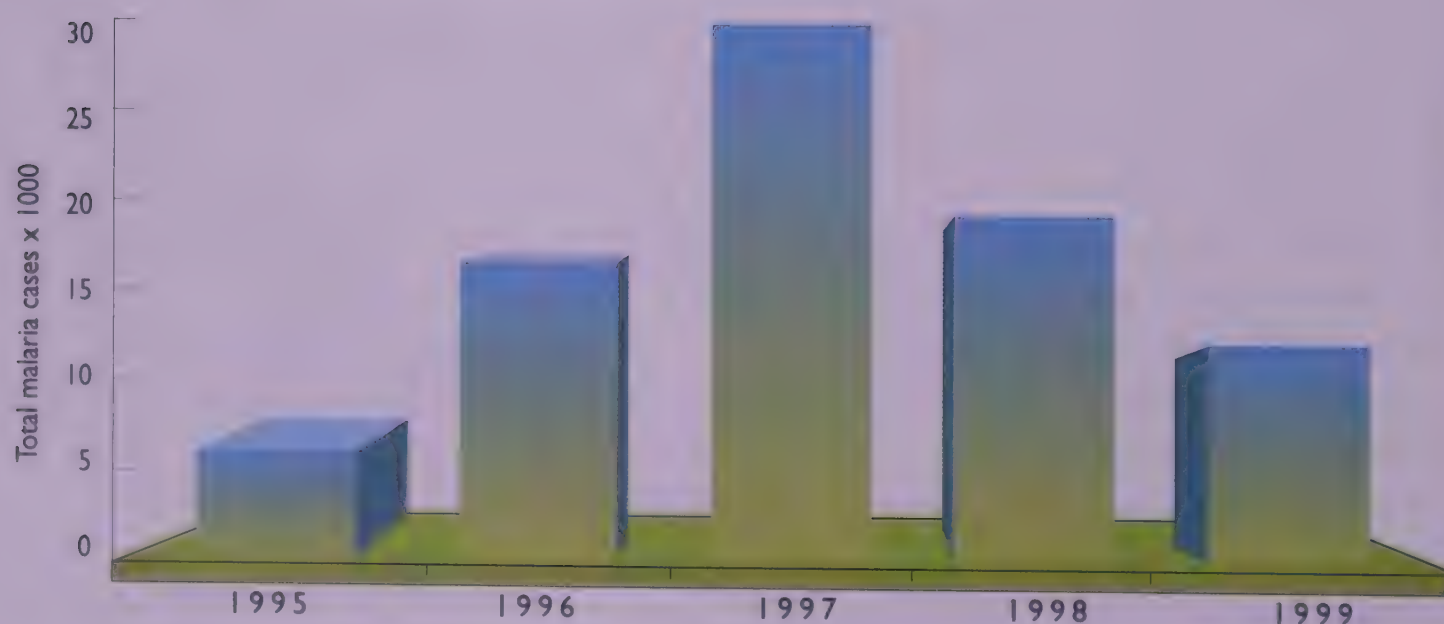
as well as strengthening the whole of the country's health system, put high priority on malaria and typhoid. Japan contributed a million dollars towards the project and funds from the governments of Austria, Denmark, Norway and Sweden provided another US\$ 300,000. In 1999, ECHO and the Italian government contributed over US\$ 500,000.

SINCE RETURNING MALARIA was concentrated in the border districts and where there were large refugee populations, basic prevention methods, including the mass treatment of 421,000 people and insecticide spraying of houses with a total area of 20 million square metres, were carried out in

1998. Although these measures led to a 35 per cent fall in malaria incidence, 19,351 cases were still recorded in 1998. In 1999, with the support of MERLIN, ACTED and UNICEF, preventative measures were expanded to include distribution of bednets and the stocking of lakes, streams and irrigation canals and other mosquito breeding places with fish that fed on their larvae. The spraying programme was maintained – nearly 65,000 houses were sprayed in 1998 and another 45,000 in 1999 – directly protecting around 300,000 people.

THE TWO-YEAR anti-malarial drive resulted, according to provisional data, in a 70 per cent fall in malaria over the first six

MALARIA INCIDENCE IN TAJIKISTAN



Source: S. Allen, Republican Centre for the Control of Tropical Diseases, Tajikistan

months of 1999. Experts attribute its success to the positive impact of a combination of disease management activities with preventive methods, particularly the use of spraying.

TO CONSOLIDATE these successes the National Malaria Control Programme now broadcasts regular malaria prevention messages on national radio and television and is preparing brochures, posters and other materials for a public education drive.

TO FURTHER STRENGTHEN its capacity to diagnose and detect malaria and provide a full, effective course of treatment the programme has made the training of all malaria personnel – parasitologists, clinical pathologists, entomologists, laboratory technicians and their assistants – a priority issue along with strengthening laboratory facilities at regional, urban and district levels.

TRAINING COURSES and workshops are often conducted on the “cascade” principle where international experts train a first group of senior technicians, who then act as trainers in subsequent sessions. WHO provided equipment, training manuals and aids. Experts and local staff maintained the process of continuous knowledge transfer.

ALTHOUGH A MALARIAL disaster has been avoided for the time being in Tajikistan and, at the same time, the



country's threatened typhoid epidemic has been brought under control, all partners agree that the country's problems are far from being solved. Systematic malaria control activities, which the government cannot fully implement due to lack of resources, need to be continued.

Intersectoral collaboration needs to be built up and closer coordination is needed between UN agencies, NGOs and other relief organisations. Reinforcement and strengthening of the impressive results already recorded is paramount if the programme is not to lose momentum.

*Information provided by Anatoli Kondrachine
WHO, Switzerland and
S. Aliev, Programme Manager RBM, Tajikistan*



DYNAMIC GLOBAL MOVEMENT

CHARACTERISED BY SHARED COMMITMENT AND TRANSPARENCY, THE RBM PARTNERSHIP WORKS TOWARDS BUILDING A DYNAMIC GLOBAL MOVEMENT TO FIGHT MALARIA.

A MODEL FOR BUILDING PARTNERSHIPS

SUDAN

INCREASING awareness of Roll Back Malaria principles and identification of priority health areas were top of the agenda when RBM's Sudan partners gathered in Khartoum in August 1999 for a Roundtable Conference – a coordinated, interactive consensus-building exercise.

THE MEETING studied newly-gathered data about Sudan and its health problems – and, with an estimated seven million cases and 35,000 deaths a year, malaria ranks first – before going on to discuss Sudan's current situation, achievements and constraints; priority health areas and the role that RBM can play in reducing the country's disease burden.

THIS SUCCESSFUL roundtable process – which has been suggested as a model for partnership-building in other countries – also



provided an opportunity for participants to appreciate how inadequate are the human and financial resources available to Sudan's health system.

FRANK, productive debate among all parties produced consensus on

several important issues including the adoption of Ten Top Priority Areas for health for 2000-2001 (in which communicable diseases rank second only to strengthening the country's health system); the issuing of the Khartoum Declaration for Health (which emphasises that malaria is the country's primary health problem); and the need for a tracking system, plus mid-term evaluation, to monitor both the commitment of partners and the outcome of their actions related to the declared top ten priorities. Outcomes will be shared, facilitating commitment by the

respective partners according to their comparative advantages.

“SUDAN IS AN ORPHANED COUNTRY and has difficulty in mobilising international interest,” explains Dr Kabir Cham, RBM’s focal point for countries in the Eastern Mediterranean region. “The country is now moving from orthodox methods of malaria control towards building an effective mechanism for partnerships and going to scale on RBM actions. The Roundtable discussions have shown how RBM and its partners – UN and bilateral agencies, international and local NGOs – can nurture this process by working intra- and inter-sectorally within the Ministry of Health and with local communities.”

SINCE ALL PARTIES recognise that Sudan, as a developing country, has scant health care resources of its own to meet RBM objectives, local promotion of RBM values is crucial to maintaining the commitment of local and international partners. Two of RBM’s keenest supporters in Sudan – the Director- General of International Health Dr Zeidan Adbu Zeidan and Dr Omar Baraka, coordinator of the National Malaria Administration, were key players in the Roundtable discussions, which may be repeated at a more local level to allow each state to plan its RBM actions with their respective partners.

SUDAN WAS ONCE a leader in malaria control. In the 1900s, during the period of British colonisation, the Khartoum Brigade system was established and the experience gained in the country was used to study the feasibility of malaria control over the African continent. Although Sudan joined WHO’s global eradication campaigns of the ’50s and ’60s the country’s vastness, weak health infrastructure and financial difficulties hampered progress.

SERIOUS EPIDEMICS in the mid-70s led to the establishment of the Blue Nile Health Project with contributions from the Sudan





government, WHO, the World Bank, Kuwait, Japan and the USA. The project covered Gezira state, an area of Central Sudan of paramount economic importance. Malaria control was a prime component of the project and the ten-year programme successfully brought prevalence down from 25 to less than one per cent before it was halted by lack of funding in 1989. As often happens, malaria returned to Sudan, where people had lost their immunity during the period of low transmission, with a vengeance and dramatic epidemics occurred in 1993 and 1994.

MALARIA CONTROL ACTIVITIES in the Sudan continue to face many problems and constraints, and it was these factors that the Roundtable Conference debated. Disease potential has increased mainly to massive expansion of agricultural projects, refugees, the parasite's resistance to medicines and

mosquito resistance to insecticides. Poor health coverage and a weak health information system compound the country's problems.

WHO ALLOCATED a special budget for intensified malaria control in Africa in 1997. Sudan received over a million dollars, the country's largest source of support since the Blue Nile Project. Areas of intervention included strengthening the country's capacity to manage malaria, improving health personnel skills and providing increased diagnostic facilities. Inter-country training of trainers (TOT) courses were followed by "cascade" training throughout the regions and the establishment of a system for monitoring the efficacy of medicines and the parasite's acquired drug resistance. Laboratory services, training and equipment were also updated. Two workshops to review treatment guidelines led to a new national protocol for antimalaria treatment.

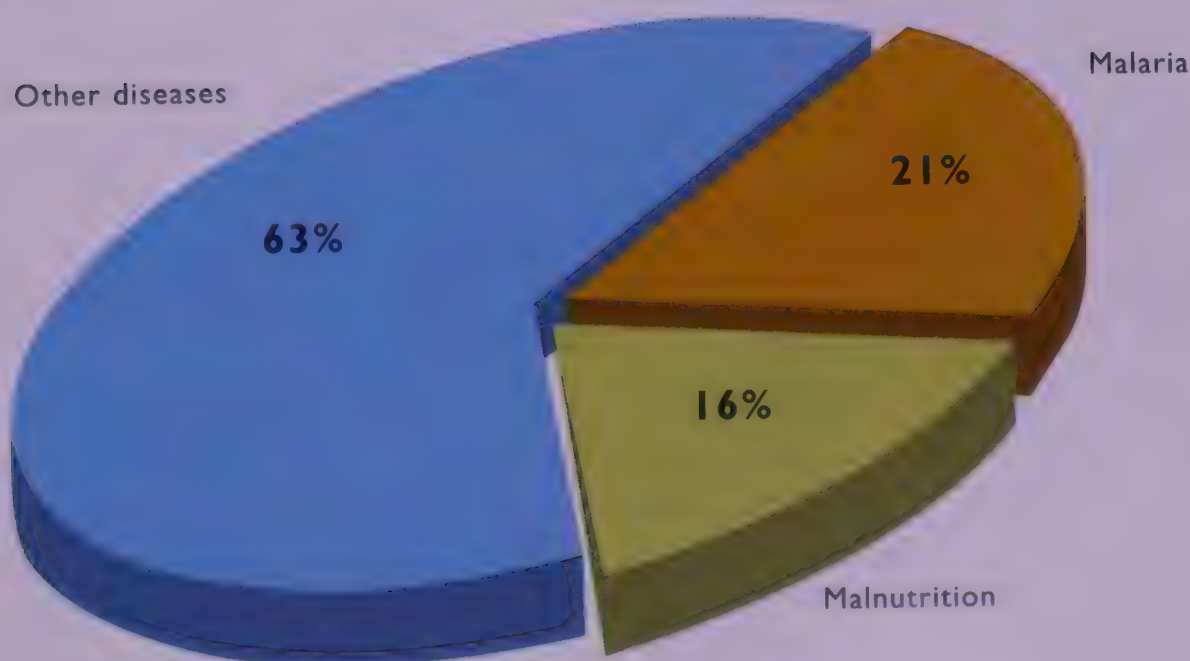
SUDAN ALSO STRENGTHENED its ability to respond to malaria epidemics with another inter-country workshop at the end of 1997. Its findings were published as a draft national contingency plan for epidemic control. Entomological surveillance was improved and a central stock of anti-malarials, insecticides and spraying equipment was made available and successfully used during heavy floods in 1998.

THE EXTRA funding made available to Sudan undoubtedly improved the country's ability to respond to malaria. National training facilities (40 per cent of the spend) and supply and equipment (32 per cent) have been

improved and the two main training centres, the Gezira Blue Nile Research & Training Institute and the Sennar Malaria Training Centre have been upgraded. Extra-budgetary and special funds have been used for applied field research projects, including forecasting epidemics, school-based control and the use of insecticide-impregnated materials. These, backed by the commitments of the Khartoum Declaration, have provided the groundwork for rolling back malaria in Sudan.

*Information provided by Zeidan Abdu Zeidan,
International Federal Ministry of Health, Sudan*

MALARIA BURDEN IN SUDAN, 1999



Source: National Malaria Administration, Sudan (1999)

MALARIA WAS ONE of the topics raised at a recent workshop in Uganda to discuss outcomes of economic reform in the context of the World Bank's Comprehensive Development Framework (CDF).

UGANDAN MP Dr. Gilbert Bukenya argued strongly for prioritization of malaria within the CDF. He stressed the need for increased government and donor support to

communities in order to "Roll Back Malaria" throughout the country.

WHAT DOES IT MEAN to be a partner in the Roll Back Malaria partnership? This is a question that RBM's Ugandan partners have had to ask themselves during their monthly meetings under the chairmanship of the Director General of the Ministry of Health. Each of the organisations in the RBM partnership has had the opportunity to articulate its comparative advantage within the partnership and this has been helpful to both the donors and government in defining individual roles.

THE MONTHLY forum in Uganda has also been helpful to the National Malaria Control Unit which is in the process of prioritizing its national workplan. Areas of duplication by partners are being identified and these will be rationalised to maximize benefit within the partnership.

ONE OF THE EXISTING successful partnerships to fight malaria in children is between the Integrated Management of Childhood Illness (IMCI) and Uganda's malaria control programme. Staff from the



two organisations, realising that the product of their joint efforts would be greater than the sum of their individual efforts, have formed a system of zonal teams at district level. Zonal teams are groups of health workers who have been jointly trained by both programmes. Tools are now being developed to supervise the zonal teams.

ANOTHER SUCCESSFUL partnership involves 13 pilot districts and a revolving fund system supported by the World Bank. The District Health Services Pilot and Demonstration Project (DHSP) – one of the major sources of Health Sector Support – has a specific malaria component which has piloted the introduction of insecticide-treated nets (ITNs) at subsidised rates to people in the selected pilot districts.

ALTHOUGH THERE is still a lot of work to be done in making ITNs widely available, some of the first districts have demonstrated that it is possible to encourage communities to use ITNs through the revolving fund system.

IN TORORO DISTRICT, one of the first to receive support, the response to the initial supply of subsidised ITNs has been encouraging. However, local community leaders feel that their price is still too high



and they welcome any measures that can cut costs. A reduction of taxes and tariffs is one of the options available to push the retail price of ITNs down to acceptable levels for the majority of Ugandans.

THE WORLD BANK, with other RBM partners, has received assurances from the Government of Uganda that taxes and tariffs on ITNs will be waived in the country in order to help increase availability of nets at affordable prices.

*Information provided by John Stephen Osika
and Sandii Lwin, World Bank, USA*

PRIVATE SECTOR *C*OMMITMENT MAKES A DIFFERENCE

AZERBAIJAN

SUSTAINED, LONG-TERM finance for malaria projects in Azerbaijan has been provided with a three-year, US\$ 760,000 contribution from ENI, the Italian oil and gas company. ENI, operating in Baku with the company's subsidiary organisation AGIP Azerbaijan, has already supported many local development projects, including assistance in vector control projects.

THE FUNDS, which will be divided roughly equally over the 1999-2001 period, will create a reliable, ongoing supply of medicines, equipment and insecticides as well as fund training to improve local expertise and strengthen health services.

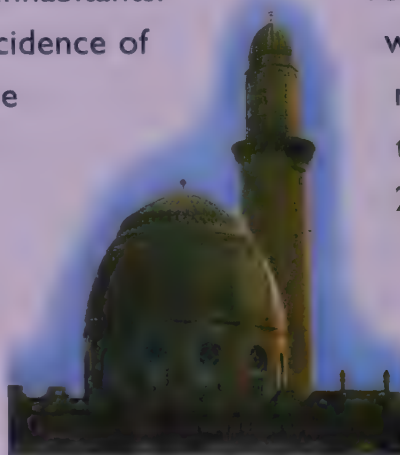
THE PROJECT will span 40 districts in Azerbaijan covering 1.5 million inhabitants. Its objective is to reduce the incidence of the disease by 50 per cent in the infected areas and to prevent it spreading to non-infected regions and to neighbouring countries. UNICEF, the International Federation of the Red Cross and

Médecines Sans Frontières – Belgium will join ENI and WHO in the project under the umbrella of the Roll Back Malaria global partnership.

ALTHOUGH malaria was practically eradicated in Azerbaijan in the 1960s it returned with the deteriorating social, political and economic change that occurred in the region. Since 1993 there have been more than a million refugees in the country, there are problems with seasonal worker migration and government health resources have declined.

AZERBAIJAN recorded a peak malaria prevalence of 13,135 cases in 1996. Limited control measures, conducted with international assistance, managed to reduce figures to 5,175 in 1998, but it was feared that, if the appropriate measures were not taken, the situation would rapidly deteriorate to 20,000 cases within a year.

DURING HIS assessment of the malarial situation Dr Guido Sabatinelli, Regional Advisor in WHO Regional Office for Europe



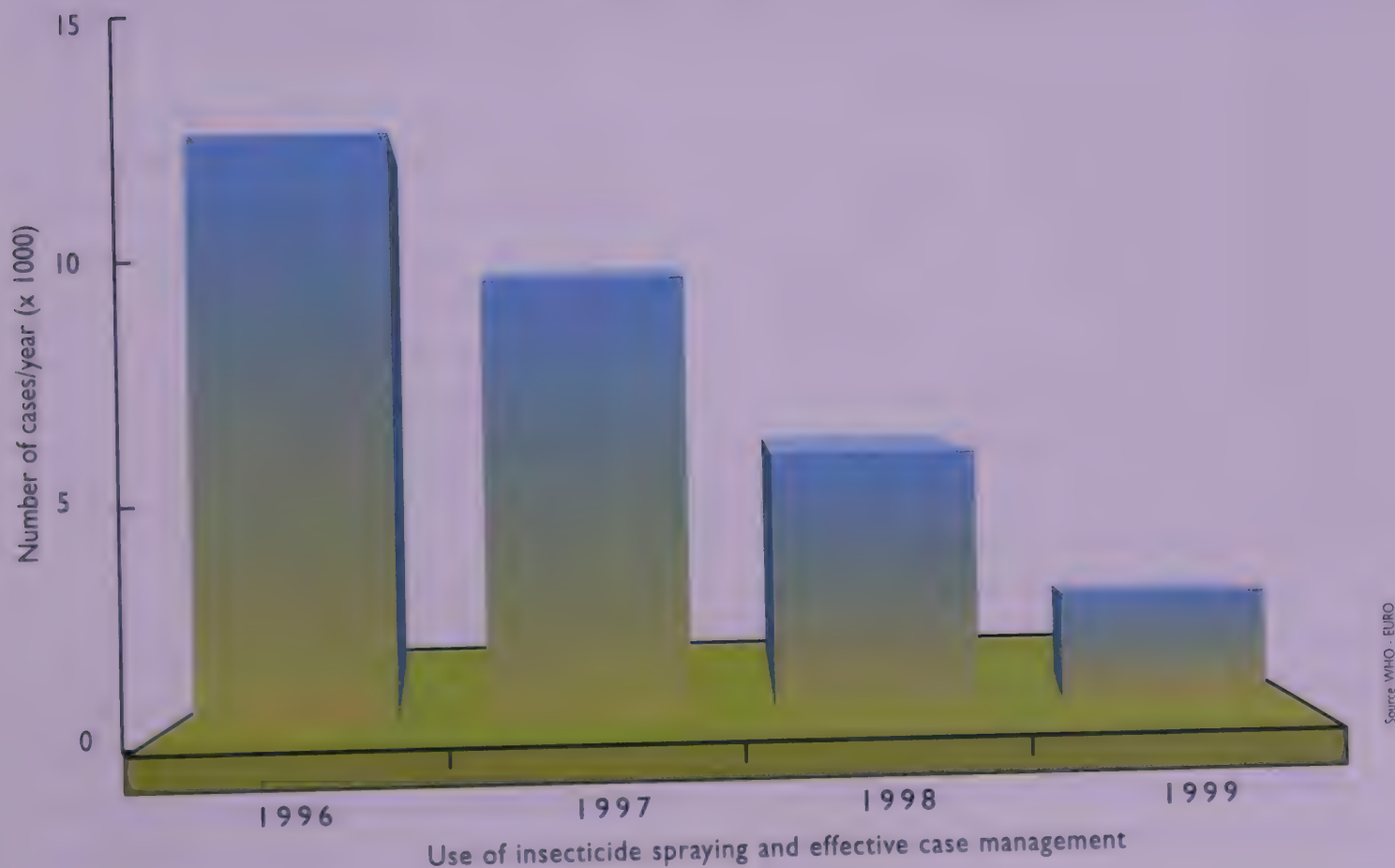
(EURO) wondered if ENI would be interested in expanding on the work done in previous vector control projects. He spoke with ENI's senior medical officer in Rome and there was soon enthusiastic senior management support for the expansion of ENI's anti-malarial activities.

DR SABATINELLI, working within strict WHO guidelines for interaction with commercial enterprises, eventually secured an

agreement that ENI would entirely finance the US\$ 757,100 that WHO estimated it would cost to address the epidemic and keep malaria under control. Azerbaijan's Ministry of Health would implement the programme, WHO (EURO) would hold the budget and provide administration, with partners working together under RBM.

AS WELL AS an expected US\$ 300,000 UNICEF contribution, which will be funded

REDUCING MALARIA CASES IN AZERBAIJAN





through USAID, Médecines Sans Frontières-Belgium will provide support in two areas – the training of spraymen and the supervision of laboratory diagnosis. The International Federation of the Red Cross will contribute to malaria control and treatment in displaced persons and refugee camps.

BY OCTOBER 1999 supplies of equipment and medicines for malaria analysis and treatment were in place. Mosquito-control supplies were also ready for use. Also, WHO experts in planning, diagnosis and mosquito control were working on training materials as well as providing technical support.

TO PUBLICISE the drive the Azerbaijan Ministry of Health and the project's liaison

office have created three television advertisements on malaria prevention to increase awareness in the general population. A leaflet has been produced and a public awareness video and booklet are planned.

THE PARTNERSHIP has succeeded in dramatically reducing the burden of malaria to almost 2,500 cases in 1999 and offers many new possibilities for RBM collaboration. ENI also operates in many other malaria-affected parts of the world such as Nigeria, the Congo and Angola, where it supports local health care initiatives.

*Information provided by Guido Sabatinelli,
WHO-EURO, Denmark*



EVIDENCE-BASED DECISIONS

PEOPLE NEED INFORMATION TO UNDERSTAND THE RISKS OF MALARIA
AND TAKE APPROPRIATE AND TIMELY ACTION.
WITH EVIDENCE-BASED DECISIONS IN THE COMMUNITY
MALARIA CAUSES LESS SUFFERING AND DEATHS.

*L*EARNING ABOUT MALARIA CAN BE A GAME

KENYA

SOMETIMES A general lack of information about malaria makes the people who suffer most accept an unnecessary disease burden as just another part of their lives.

A SPLENDID EXAMPLE of how ignorance can be fought with education was the successful play *Mosquito Mask* written by a Kenyan high school teacher with help from a vector entomologist and performed by schoolgirls. This highly popular play was picked for Kenya's 1997 National Drama Festival. "The play reflected real life," explains local government official Peter Onyango Apunda. "People like drama. What they not only hear, but can also see, will stay in their minds."

MOSQUITO MASK was a collaborative effort between the teacher, Ellie Owagogo, and Dr Clifford Mutero of the International Centre of Insect Physiology and Ecology (ICIPE) which runs a research, training and developmental activity centre at Mbita town on the shores of

Lake Victoria close to Sindio Secondary Girls School, where Ellie Owagogo teaches.

THE TOWN OF MBITA is almost completely surrounded by the waters of Lake Victoria and is home to some 6,500 people. Although fisheries, agricultural and tourism offer development potential, the people face hardship in their struggle to survive lacking, for example, a basic infrastructure of tarred roads, safe drinking water and electricity. Health facilities are few and medicines are in short supply.

ALTHOUGH AIDS is an increasing worry in this polygamous society, malaria is the main killer and the worst health problem with official 1995 figures showing that the number of cases exceeded 55,000 in a district where the total population is 150,000.

PAST EFFORTS by NGOs in the Mbita locale have concentrated on malaria case management and preventative measures such as bednets, mosquito coils and sprays. People



now know the value of bednets, but they are expensive – each costs about a third of a family's month income – and treated nets or retreatment facilities are often unavailable.

FURTHER COMMUNITY ACTION is planned by ICIPE for a millennium drive against malaria. The ICIPE International Primary School has planned a Roll Back Malaria project and students and teachers are now seeking funding for music and drama projects that carry the malaria message into the community. School activities also include clearing waterways and other measures to reduce breeding sites.

COMBINING BEDNET impregnation days with "fun" educational activities, including music and drama, is another new project from ICIPE and the Green Town Partnership Association in Mbita. The association, with ICIPE support, is developing its own action

plan to clear the town of breeding sites and supply the demand for treated bednets that the awareness programmes will produce.

TREATING PEOPLE'S NEEDS in a holistic way is part of ICIPE's BioVision Biolsland Project. Working with schools, NGOs and community self-help groups is a vital part of its drive to roll back malaria. "ICIPE is part of the Mbita community and people should benefit from the wealth of knowledge and experience that ICIPE has to offer," says Director-General Dr Hans Herren. "My millennium message to the people of the Suba district is that we will work through research and community actions to help them solve their problems in human, animal, plant and environmental health."

*Information provided by Ingeborg van Schayk
and Clifford Mutero, ICIPE-BioVision, Kenya*

IN RURAL AFRICA self-diagnosis and self-treatment of malaria are commonplace. People often take medications which can be bought without a prescription – home remedies, antimalarial medicines or both – for fevers. In some places chloroquine is taken more often than aspirin for minor fevers, aches and pains.

ALTHOUGH ANTIMALARIAL MEDICINES can be obtained from health centres – often free of charge – and pharmacists, many medicines are purchased from shops, markets and street vendors. People bargain with vendors to buy the drug of their choice, but neither buyer nor vendor know how much of the medicine to take.

SUCH PRACTICES frequently lead to ineffective treatment of fevers, increased toxicity and side effects, and can accelerate drug resistance. Most shopkeepers are not qualified to diagnose, do not know the correct drug or appropriate dosage for a complaint, do not store the medicines properly and quite frequently sell substandard or counterfeit products. There is serious concern that these routine practices, which are so linked to peoples' lives, might lead to at least 70 per cent of children's fevers

receiving inadequate or even dangerous treatment. To make matters worse these examples represent a missed opportunity to fight malaria and reduce suffering and death.

ONE PROMISING PROJECT which addresses these issues has taken place in Kilifi, a rural district of coastal Kenya. Supported by the Kenya Medical Research Institute in partnership with DFID, UNDP, WB and WHO the project set out to train shopkeepers in the use of antimalarials so that they could make the best out of their existing retail practice. Forty-six shopkeepers from 23 shops selling a wide variety of goods including medicines were selected for training.

DURING THE NINE-DAY workshop the shopkeepers were trained in giving out information on using the most commonly-bought antimalarial medicines. They were supplied with dosage charts for chloroquine and aspirin or paracetamol and sets of rubber stamps showing the correct way of using chloroquine for children of different ages. They were also trained in recognising severe malaria symptoms which would point to a need for treatment by health staff.

MEANWHILE, focus group discussions showed that shopkeepers would be keen to

take on an advisory role in the community if it did not diminish their income. The combination of increased knowledge, social status and profits proved a powerful incentive. Equally important was the support of the people who recognised the need for information on malaria and its treatment.

THE TRAINING PROJECT had a dramatic impact on the Kilifi community. Not only did it stop dangerous practices but had an overwhelming effect on chloroquine sales. The percentage of drug sales which included an antimalarial drug for children with fever rose from 34 to 84 per cent in just three months.

Chloroquine sales nearly tripled in six months and appropriate use of over-the-counter medicines increased by 62 per cent.

ONE OF THE TOP PRIORITIES in today's efforts to combat malaria is the urgent need to utilise existing tools and practices in a cost-effective manner. The successful approach of this project shows how malaria control can benefit by harnessing human inclinations to resources that are already in play.

*Adapted from an article by K. Marsh
"Changing home treatment of childhood fevers by
training shopkeepers in rural Kenya", KEMRI, Centre
for Geographical Medicine, Kenya*



IN 1977, THE MEDICAL STAFF of Bignona health district found itself unable to cope. All the beds in the district health centre were occupied by malaria patients, many of them children. The hospital courtyard of Bignona district hospital had been converted into a makeshift ward and health workers had difficulty making their way through to the consultation and treatment rooms.

THE CHIEF PHYSICIAN was on the point of resigning when, thinking the problem over one day, he realised that only the people of Bignona themselves could help. Local communities are highly organised, so he decided to take advantage of this fact and get them involved in malaria control activities.

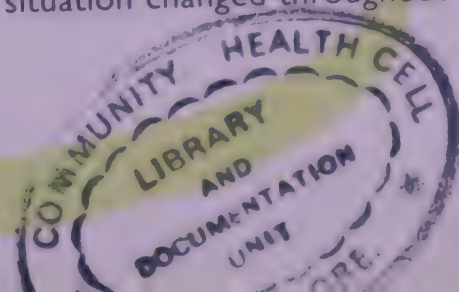
THE MAIN STRATEGY of the community support network that was set up in all the villages in the district was to provide community care for malaria patients by training networks, setting up a unit to treat bednets with insecticide and holding health education talks. This encouraged the community to make malaria control part of everyone's daily routine. District representatives, women's groups, community health workers, community focal points,

NGOs, religious leaders, health committees and village organisations all had a role to play. Multisectoral collaboration was an important element in the network while partnership was the basis and the key to success.

THE COMMUNITY support network had the same facilities at every location in every geographical area of the district: a small committee with a coordinator, a secretary, a general reporter and a technical adviser. A larger committee met every three months.

AFTER A YEAR, the community support networks were well established in the various districts and were doing important work. Bignona district health workers provided education and training for the people and the district health centre supplied a technical adviser. In each community group people were given specific responsibilities and certain individuals were designated to liaise between medical staff and the community. They were taught to recognise the signs of simple malaria and treat it, and how to recognise serious cases which needed referring to a health centre.

IN ONE YEAR of malaria control, the epidemiological situation changed throughout





the district. The Bignona health centres were no longer overrun with malaria patients. Prevalence had fallen to such an extent that the doctor who had started the community involvement strategy, and the rest of the staff, felt they were underemployed. Serious cases of malaria fell by 64 per cent and infections by 44 per cent. Community responsibility kept the support network going and maintained the momentum.

THE DOCTOR who began the programme is now in another district, but the Bignona

network is still going from strength to strength. As well as becoming a major player in solving the health problems of the district, it has shown how partnerships between communities and health services can work. The communities are no longer simple beneficiaries of health work, but partners of the health workers in solving health problems.

Information provided by Tieman Diarra and Moussa Thior, Popeguine Health District, Senegal

UNDERSTANDING THE *R*ISKS OF MALARIA

PHILIPPINES

THE DIFFERENCE THAT a well-organised community force can make to malaria control has been demonstrated by a project that has been taking place over six years in the *barangay* (villages) of Morong district in the province of Bataan, about 165km north-west of Manila.

ALTHOUGH BATAAN is an area of low malaria prevalence there are numerous streams in its hills and forested areas which provide ideal breeding sites for mosquitoes. The province is populated by subsistence farmers who augment their income by daily wage labour, charcoal-making and collecting firewood and tubers in the forests to sell in local markets. Others are fishermen, shop owners or drivers.

FREE HEALTH SERVICES are provided by the Rural Health Unit and *barangay* health stations but villagers have to travel an hour by boat or bus for hospital services. Community health workers and midwives have provided primary health care since 1981, but only in 1995 were laws passed to recognise their work with benefits and incentives. The Federation of *Barangay* Health Workers, which was established during the devolution of the Philippines health services,

now provides additional support to sustain their work.

THE MORONG district's programme emphasised a multidisciplinary approach to malaria control. It drew on the experiences of an earlier, short-lived, volunteer programme which failed through lack of proper supervision and supplies.

THE FIRST STEP was a full consultation process to set the programme's objectives and strategy. It was then the turn of community members to select volunteers. Candidates were sought who were respected





and credible within the community. Once selected, the volunteers attended a three-day training session which, as well as teaching malarial control and detection, devoted a whole module to addressing misconceptions about malaria prevailing in the *barangays* and among the volunteers themselves.

THERE WERE NO DROP-OUTS from the 24 volunteers who started the programme. After training, the established network of community midwives was used to introduce them to the *barangay* officials and the members of the community with whom they would work. The volunteers enlisted the help of other *barangay* members. They set up a “buddy” system to aid early detection and

treatment. They recruited spouses or neighbours to assist them and their numbers increased to 33 within a few months. Their ages ranged from 13 to 60 and completed school-time from less than one year to 12 years.

A FEW MONTHS AFTER the programme got underway the volunteers began to assist Malaria Control Services field personnel in distributing bednets as well as helping with residual house-spraying in Morong.

The volunteers provided vital organisation for bednet distribution and re-impregnation with insecticides. Later, the volunteers’ brief was expanded to include other health problems, giving them a wider role as health

workers. Refresher courses revised the original workshop topics but also taught about acute respiratory infections, diarrhoea and hepatitis. The volunteers were taught additional management skills such as how to run income-generating projects.

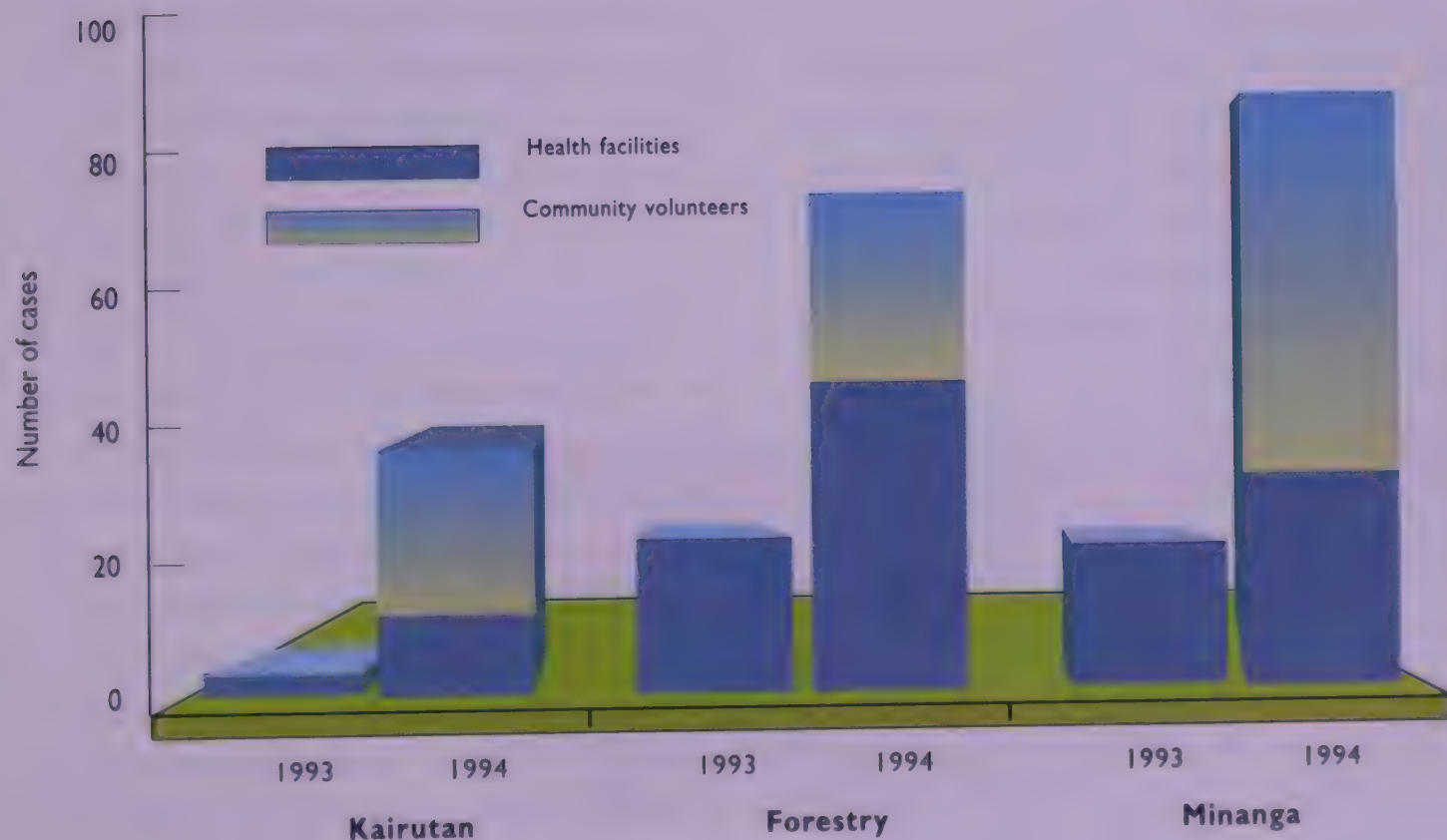
FOR EXAMPLE, during the refresher training, special attention was given to the malaria life cycle after a volunteer who had earlier participated in a quiz had said that

they still believed malaria was caused by drinking contaminated water. To further enhance the volunteers' health education role, a health education manual was provided for use in their daily work.

THE EFFECTIVENESS of the *barangay* programme is illustrated by the findings of a 1997 study that 43 per cent of local malaria cases were detected by the volunteers. Their efforts brought about a significant

MALARIA CASES DETECTED

before the training programme (1993) and after (1994) with the help of community volunteers, in Morong's towns located far from health facilities.



Source: E. Espino—Research Institute for Tropical Medicine, Philippines



reduction in the malaria parasite reservoir. Detected malaria cases in Morong decreased from 829 in 1994, to 141 in 1995 and 62 in 1996. No cases were reported in 1997.

THE PHILIPPINES experience demonstrates the effectiveness of volunteer programmes in improving access to and delivery of health care among geographically-isolated populations. It also shows their impact on the transmission and prevalence of malaria.

IT CONFIRMED the importance of a continuous development of effective strategies to recruit, train,

support and retrain health volunteers – not only with the capacity to identify malaria symptoms and to refer patients, but with the knowledge and teaching materials needed to refute malaria folklore.

FINALLY IT SHOWED that, at a grass-roots level, the volunteers themselves are in the best position to promote malaria

control activities once their own misconceptions about the disease have been changed.



Information provided by Effie Espino, Research Institute for Tropical Diseases, Philippines



MULTIPLE PREVENTION

RBM PARTNERS ARE SECURING A 30-FOLD EXPANSION IN THE PROPORTION OF PEOPLE AT RISK WHO USE INSECTICIDE-TREATED NETS. THIS CONTRIBUTES TO BETTER MULTIPLE PREVENTION OF MALARIA.



QUESTION OF MARKETING

TANZANIA

SMITN STANDS FOR “Social Marketing of Insecticide Treated Nets.” The largest insecticide-treated net (ITN) social marketing project in Africa, SMITN, established in 1998, has shown that it is possible to distribute mosquito nets quickly and widely among poor urban and rural populations.

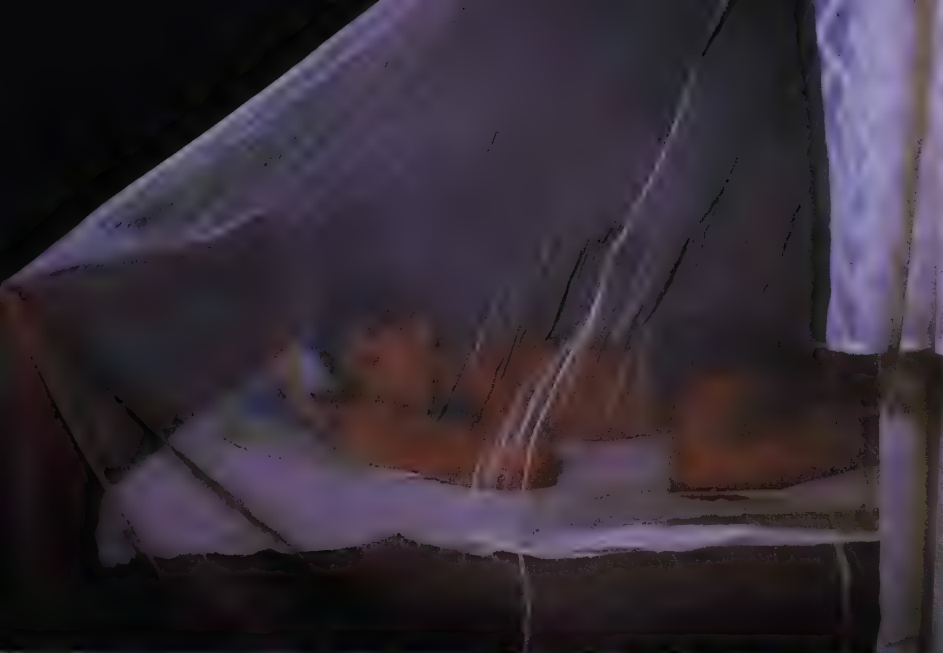
TANZANIA is home to some of the worst malaria problems in the world. One out of every ten of the world’s deaths due to malaria cases occurs in Tanzania. However, insecticide-treated nets – so effective in protecting young children from mosquitoes – were found in fewer than ten per cent of all homes. This is in spite of the fact that Tanzania is one of the few African countries with a commercial net manufacturing capacity.

STUDIES HAVE SHOWN that the main reason households, especially in rural Tanzania, don’t own nets is not because they are unwilling to pay a reasonable price for

them. Rather it is because the nets and the insecticide are unavailable locally, sellers are too far away, or the nets are unrealistically expensive. “Even if you are ready to buy them, they are not available in this village,” complained one man. In many cases, the cost of travelling to a vendor to purchase a net was almost as high as the net itself. Potential vendors said nets were often not sold in their shops – not because they felt there was no market – but because they lacked the capital to purchase stocks.

THE SMITN PROJECT was also prepared





to address these challenges by improving access to affordable nets, by making a dip-it-yourself re-treatment kit available and by allowing consumers to treat their nets at home. The project, run by Population Services International (PSI) and the Government of Tanzania with support from DFID, made ambitious plans to reach out to targeted districts covering a population of nearly five million people. It featured a creative advertising and marketing campaign, which used road shows and traditional songs and dances to increase demand for the nets and home insecticide treatment kits.

A FEW IMPORTANT LESSONS have already been learned from the project. First, use a wide range of distribution channels. In Tanzania, not only were clinics and dispensaries used, but also hospitals, drug stores, commercial shops, street hawkers, religious organisations, NGOs and women's

groups. Second, don't give the nets away – bring down the cost so they are affordable and encourage the user to value them. And third, find ways to make the nets more valuable and attractive. For example, it was discovered that mothers were much more eager to purchase baby-blue coloured nets than those in standard white or light green.

MORE EDUCATION is needed so that consumers can properly understand the less tangible, but dramatic, health benefits of using an insecticide to treat their net, but the project's insecticide sales are already outstripping net sales. After one year, the purchase price had dropped significantly, to under US\$ 5 per net without any subsidies.

THIS RESULTED from encouraging increased manufacturing capacity and working to bring duty tariffs down; tariffs had accounted for nearly 20 per cent of the net prices. Because of reduced prices and promotional efforts to increase demand, the number of households purchasing nets had doubled after one year, reaching a significant number of all those targeted. Coverage ranged from nine per cent in some districts to as much as 51 per cent in others.

*Information provided by Guy Stallworthy
and Jane Miller, PSI, Tanzania*

LINKING A DRIVE for bednet-use in a culture where their benefits were previously unknown with the establishment of a local, income-generating, bednet manufacturing industry has won the US\$ one million Conrad Hilton Award for excellence in humanitarian health care for AMREF (the African Medical and Research Foundation).

THERE HAS BEEN little experience of introducing bednet use into a community with no prior usage, but AMREF, which has been working with Kenya's communities and government to alleviate the region's health problems was encouraged by the results of a 1991 study of the use of insecticide-treated nets in Gambia.

THE STUDY, the first randomised control trial of bednet use, showed impressive reductions in childhood deaths. However, Gambia has a cultural tradition of bednet use which Kenya did not share and AMREF faced the additional challenge that bednet supply and demand was very low, especially in rural areas.

OVER 70 PER CENT of the population of Kenya is at risk of malaria, which accounts for between a third and half of all childhood

deaths. By expanding on its experience in other malaria control projects, AMREF won funding from Glaxo Wellcome to establish its "Community-Based Malaria Control: Towards Self-Sufficiency with Insecticide-Treated Nets in Kenya" initiative.

COMMUNITY GROUPS were organised into sewing and selling bednets. An extensive health promotion campaign got sales off to a good start and over a four-year period more than 5,200 bednets were produced. By this time the Glaxo-AMREF initiative had established a viable community bednet-





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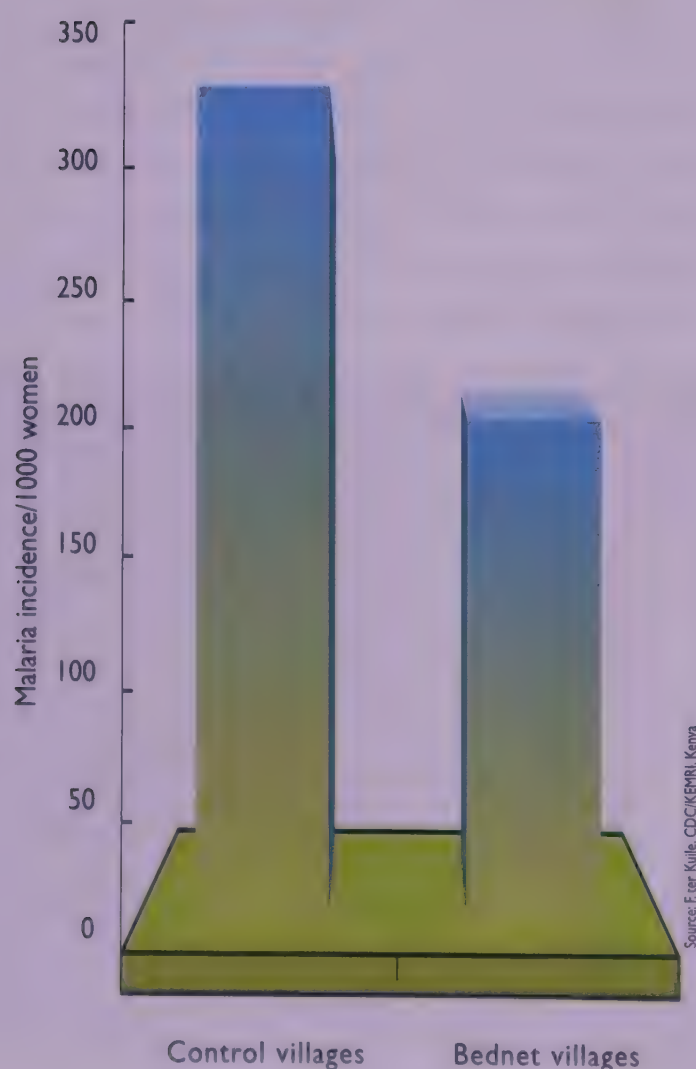
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sewing industry and at the same time, a growing practice of sleeping under bednets. Coverage in the local community of some 75,000 people expanded from 14 to 20 per cent. But this rate was still felt to be low,

INSECTICIDE-TREATED BEDNETS REDUCE MALARIA IN PREGNANCY

(Analysis from 15 villages in western Kenya)



mainly due to cost and, at less than ten per cent, re-impregnation rates were still a disappointment.

AMREF THEN LOOKED for a way to link the community-based manufacturing to established local industry – a move which would have the added benefit of attracting families with disposable income to purchase bednets. Glaxo provided bridge financing for the project. Persuasive arguments were made capitalising on employers' economic incentives to reduce health care expenditure and working time lost due to sickness. They were encouraged to provide credit facilities to make net purchases more affordable.

AFTER CONSULTATIONS with the Ministry of Health 14 employers were selected on the basis of their participation in previous projects, the size of their workforce and their location in a malaria-endemic area. Sugarcane companies comprised the majority but the list also included a brewery, a paper mill, a hotel chain and a mining company. The assistance of local NGOs was enlisted, particularly for bednet transport and delivery.

THE PROJECT obtained funding through five-year financing from DFID. Together with the Kenyan Ministry of Health AMREF launched the "Employer-Based Malaria Control in Coastal and Western Regions of



Kenya” project. The selected employers all agreed to purchase the bednets sewn by the local community groups and to encourage their employees to buy them through company credit schemes or payroll deductions. They also agreed to involve their workers’ health committees in the promotion of bednets and their re-treatment.

PROMOTIONAL ACTIVITIES were so successful that the initial demand for nets outstripped their supply. AMREF purchased ready-made nets to fill the gap, although community production has now caught up with demand. AMREF is purchasing netting materials and supplying sewing machines; training the organised community groups to sew and sell the nets with the profits being ploughed back into the community and into the network of sales agents who also supply

insecticides for re-treatment. AMREF works closely with the industry to improve products and increase their distribution through sales representatives, chemists shops and other outlets.

AMREF’S INTENTION has been to create a local market, bring new sources of income to local communities and build up supply and demand until there is sufficient interest for the survival of a self-sustaining industry. After funding and technical input comes to an end in the year 2003, AMREF will remain active for a further two-and-a-half years but will then pass project management on to the Ministry of Health and the commercial sector.

*Information provided by Anne Gichohi,
AMREF, Kenya*

BEDNETS OFFER excellent protection against malaria but their shortcomings – not everyone can afford one, difficulties with supply and re-treatment – become especially evident in politically unstable countries, countries at war and particularly

among refugee populations.

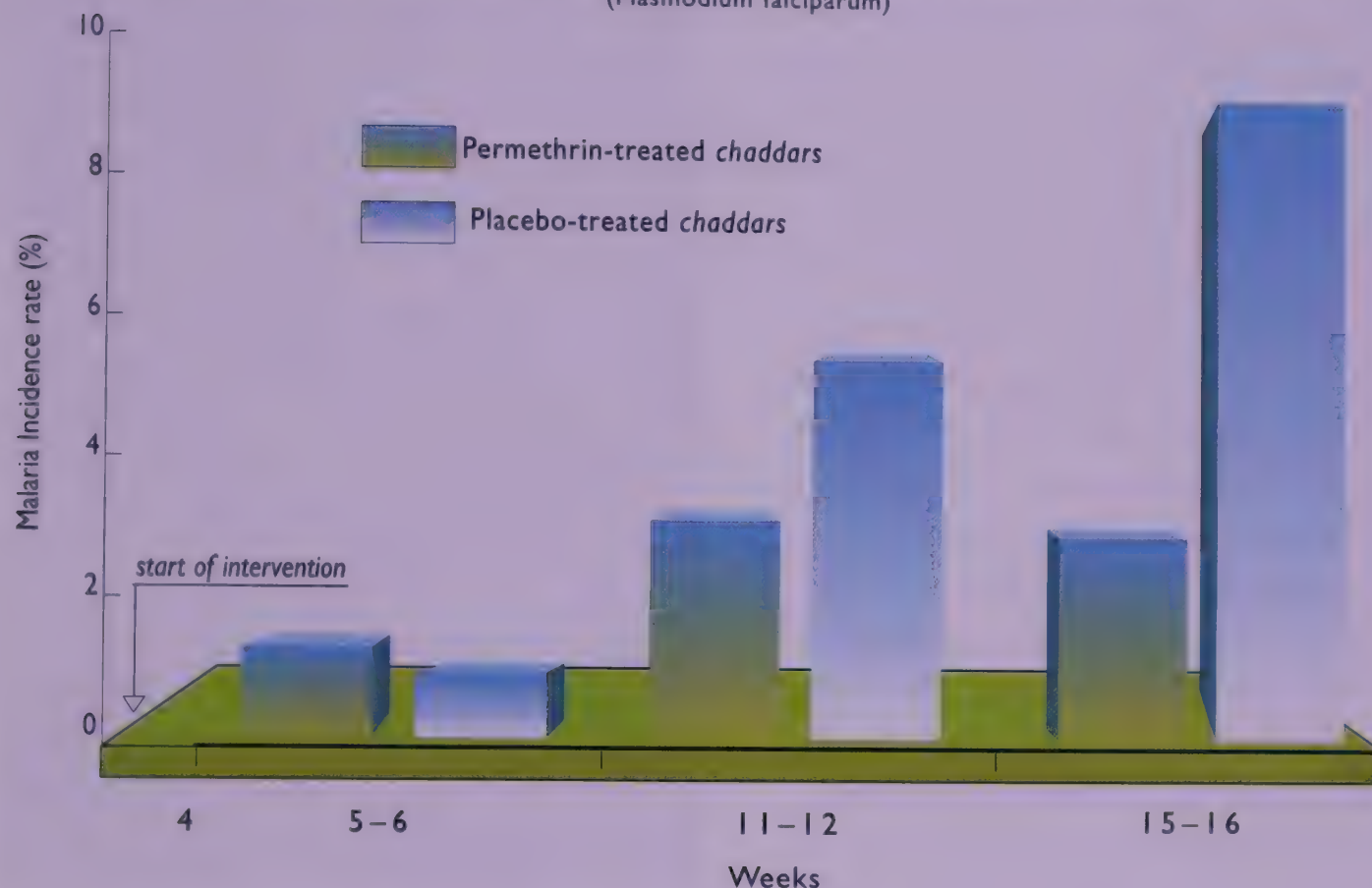
REFUGEES and internally displaced people are often forced to sleep in tents or hastily-constructed plastic shelters where nets are not suitable. There is a need to develop cheaper, locally-appropriate alternatives for populations living outdoors which do not rely on changes in sleeping behaviour or accommodation.

A RECENT STUDY at Adizai, an Afghan refugee camp in north-western Pakistan, built on the fact that Afghan women, in common with many muslim people of Asia, wear a veil or wrap known as a *chaddar* to cover their head and upper body. Economic necessity and lack of alternatives means that the *chaddar* is often used as a sheet by both sexes and children at night, providing warmth and partial protection against biting insects. Recognising that insecticide treatment of the *chaddars*, along with the top-sheets and blankets provided to the refugees by relief agencies, would protect entire families against marauding mosquitoes, a team of doctors conducted a study.

THE RANDOMISED TRIAL selected ten per cent of the 510 refugee families from the



INSECTICIDE-TREATED CHADDARS PROTECT AGAINST MALARIA (*Plasmodium falciparum*)



Source: Adapted from original M. Rowland et al. London School of Hygiene and Tropical Medicine, UK

3,950 refugees living in the camp to have their chaddars and top-sheets treated with permethrin, the least dermatologically irritant of commonly-used insecticides. Another ten per cent of the refugee families was chosen as a placebo control group.

AT THE SAME TIME a HealthNet International (HNI) field centre at a larger, neighbouring refugee settlement in Azakhel (population 14,500) agreed to undertake an entomological field study to investigate how

the treated *chaddars* might best protect against mosquitoes. HNI runs a health centre at Azakhel where the Adizai refugees are registered. Both camps are situated on waterlogged grounds near the banks of the Kabul river and have a high incidence of malaria. Existing camp clinic records showed that each of the refugees in the Adizai camp had a 30 per cent chance of contracting malaria each year. After analysing cases through the August to November period of

the trial it was apparent that the families who had their *chaddars* and top sheets treated were showing a 64 per cent protection against falciparum malaria and 38 per cent protection against vivax malaria in family members under 20 years old.

THE TRIAL used community health workers from the camp to help explain the treatment process to the refugees. Family elders were invited to demonstrations and explanations, where it was emphasised that the treated *chaddars* should be kept away from direct sunlight and should be washed only sparingly, as washing decreases the insecticide's effectiveness.

THE ENTOMOLOGICAL study at the HNI settlement attempted to simulate man-mosquito contact in outdoor sleeping conditions, using net traps to gather live and dead insects which were then examined and identified. It concluded that mosquitoes were 70 per cent less successful at feeding on men protected by the treated materials.

THE EXPERIMENT also used caught mosquitoes to measure the toxicity of the treated *chaddars* and the effect of time on their potency. The results showed that even at low concentrations the cost per person protected and the cost per case prevented were low (US\$ 0.18 and 1.29 respectively).



THE RESULTS of the treated *chaddar* trial gives hope that poor and displaced people can get appropriate and effective protection against malaria using locally-available and low-cost technologies.

Adapted from "Permethrin-treated chaddars and top-sheets: appropriate technology for protection against malaria in Afghanistan and other complex emergencies" by Mark Rowland et al. published in the Transactions of the Royal Society of Tropical Medicine and Hygiene, 93, 465, 1999

U SING TREATED MOSQUITO NETS

VANUATU

THE SMALL PACIFIC island nation of Vanuatu will soon be the first country in the world where virtually every household has insecticide-treated nets. The Vanuatu National Malaria Control Programme, started more than ten years ago, has distributed more than 100,000 insecticide-treated nets to cover a population of approximately 158,000 people.

EVEN MORE SIGNIFICANT is the fact that the treated nets are part of an integrated programme with improved diagnosis and treatment that has dropped the annual malaria incidence in Vanuatu from 184 in 1988 to 33 in 1999 and reduced malaria deaths to zero since 1996. This is a remarkable achievement for such a small nation.

MOTIVATED AND HIGHLY active communities have been key to Vanuatu's success. The best example is the dedicated group of people living on the small island of Aneityum. This is the southernmost island in the Vanuatu group and its residents depend on the monthly visit of a cruise ship for most of their cash income. In 1990, after one of the ship's visits, two passengers came down with malaria. Though it was never proved that Aneityum was the source of the malaria, the cruise company told the people that

unless they could show that there was no malaria on their island, the boat would no longer make its regular stop.

FOLLOWING THIS ULTIMATUM contact was made with the WHO malariologist stationed in Port Vila, the islands' capital. Working with the community a control programme consisting of mass treatment of the entire population, distribution of insecticide-treated nets and a unique malaria quarantine system was put in place in 1991. The entire population (then 781) was treated and insecticide-treated nets were distributed to every family. To prevent the re-introduction of malaria from other islands every passenger stepping off the twice-weekly flights from Port Vila and all passengers arriving on the monthly supply ship were checked for malaria.

A FULL-TIME COMMUNITY volunteer was trained to collect blood samples and examine slides so that all visitors and residents suspected of having malaria were quickly checked and those found to be infected were treated. As a result of this massive community effort Aneityum has been malaria-free for the past eight years. The people are healthier, happy and now two

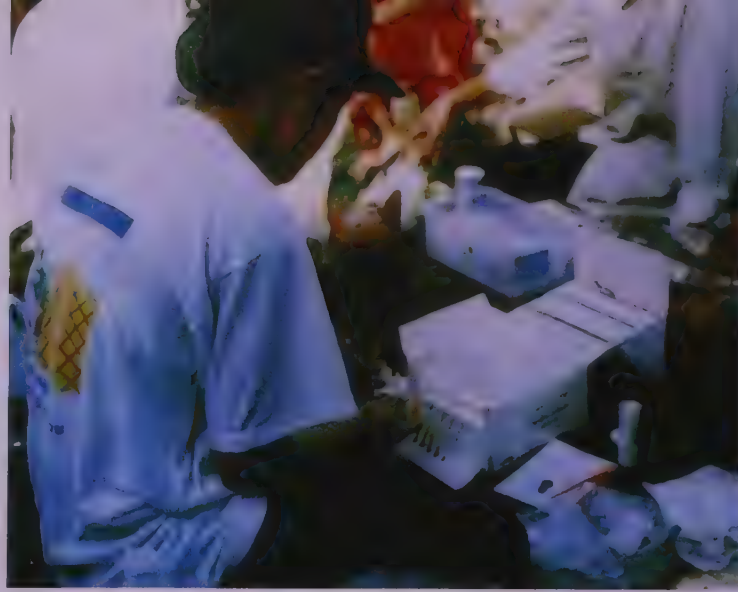
cruise ships make regular monthly stops – increasing the island's standard of living.

FOLLOWING the example of Aneityum

two other small islands have been declared malaria-free and projects on other islands are being planned. Whether a similar approach can be applied to all the inhabited islands – of which there are more than 80 – is a question that has yet to be answered.

ALTHOUGH VANUATU'S insecticide-treated net programme has so far been highly successful a recent survey has shown that there are still problems to be overcome. Some people still do not have nets because of distribution problems and 39 per cent of families recently surveyed had nets but didn't use them. The survey also found that 35 per cent of the nets were in poor condition and needed to be replaced, 43 per cent had not been retreated, and 62 per cent had been washed, thereby reducing the effectiveness of the insecticide.

BASED ON the problems identified by the survey a seminar involving a cross-section of the community was held to identify solutions. Changes were suggested



to improve distribution so that every family had the chance to purchase nets for everyone, new methods were

suggested for retreatment that took into account cultural objections to dipping nets, and a system for replacing or repairing damaged nets was proposed. Central to change was the need to increase community awareness so that everyone understood how nets protected against malaria, the importance of keeping them in good condition, and the need for regular retreatment of nets.

ALTHOUGH A SMALL ISLAND NATION, Vanuatu is far ahead of most other countries in finding workable solutions to its malaria problem. After much hard work the goal of reducing malaria incidence to ten cases per thousand population is in sight. The dedicated health staff, together with international partners including WHO, JICA, AusAID, UNICEF, Rotary Against Malaria, and the Japan Junior Chamber of Commerce have all helped make Roll Back Malaria a success.

*Information provided by Kevin Palmer,
WHO, Philippines*



COORDINATED ACTION FOR STRONGER HEALTH SYSTEMS

PUBLIC HEALTH SERVICES, RBM PARTNERS, NGOs AND PRIVATE PRACTITIONERS
CARRY THROUGH AN INTEGRATED STRATEGY IN RESPONSE TO PEOPLE'S NEEDS.

WELL-COORDINATED ACTION BUILDS ON EFFECTIVE PROGRAMMES
THAT TACKLE ALL SERIOUS ILLNESSES.

BUILDING ON EFFECTIVE PROGRAMMES

CAMBODIA

DEATH STARTS at dusk for the hill-tribe people living on the north-east provinces of Cambodia. That's when the mosquitoes emerge carrying with them one of the region's biggest killers – the plasmodium parasite which causes malaria.

WHILE THERE IS NO malaria threat in Cambodia's large cities or urban rural districts, over half a million Cambodians live in hilly areas or work in forests where malaria is rife. Sometimes rates of over 50 per cent of malaria prevalence are found in children living in hill villages. Poverty, remoteness and lack of infrastructure are the biggest challenges for malaria control.

ALTHOUGH MALARIA has long been a severe problem in rural Cambodia, thousands more cases are now reported because of the

influx of people to former Khmer Rouge strongholds. These new settlers have mostly moved into areas where years of Khmer Rouge occupation left the infrastructure in a shambles. With poor preventive measures, no medicines and next to no access to health services, massive malaria outbreaks occurred in 1997 and 1998.

THE NATIONAL MALARIA programme has since intervened with mass drug administration and distribution of nets in almost all former Khmer Rouge areas. The programme brought together several partners, including the International Federation of the Red Cross, the European Commission and WHO, to fight outbreaks in the rural areas of the country.

SYSTEMATIC distribution of impregnated

nets to forest dwellers and hill tribes started in 1996. After almost four years of formidable effort the national malaria programme and partners have reached 80 per cent of the target population in about 1,000 remote villages. Large-scale distribution also focussed on the migrant families who were urged to take their nets with them when they moved into the heavily-forested hills.

OVER TWO MILLION people – nearly 20 per cent of Cambodia's population – regularly go into the forests for logging, hunting or gem mining. Promoting the use of hammock nets to this high-risk group is critical. Health education, as well as public campaigns, have helped bring this message to the people. Former Khmer Rouge areas alone received



almost 70,000 impregnated nets which protected 160,000 new settlers. The results were impressive with no malaria outbreaks recorded in the large

areas in 1999. There have been only three recent outbreaks and these occurred in remote districts that could not be covered before the start of the 1999 rainy season.

DURING mosquito net distribution activities in remote areas additional outreach activities are usually delivered to the people with the help of local NGOs. The villagers are screened for fever – the likelihood that fever is caused by malaria is more than 50 per cent in these areas – and for signs of disease.

ALL FEVER CASES are treated for malaria, medicines to treat hookworms are



given out and children receive vitamin A capsules. It is not uncommon for malaria control workers to treat acute eye infections or to take a seriously-ill patient to the closest referral hospital on the way back from a bednet distribution mission. Other integrated activities include screening for leprosy, child vaccination for measles and tetanus, and iodine supplements for women of child-bearing age.

CAMBODIA'S COMMITMENT to malaria control has paid off. Deaths from malaria recorded in hospitals declined from 1,500 in 1992 to just over 600 in 1998, although control efforts intensified from 1996 onwards. Incidence among tribal people living in areas with high transmission have also dropped, although high malaria transmission is still a challenge. The success and popular appeal of the bednet distribution campaign has created a culture into which other health activities can be integrated.

WITH STRONG political backing to reinforce health services and international support those areas hardest hit by the malaria epidemics of today can provide the success stories of tomorrow.

*Information provided by Stefan Hoyer,
WHO, Cambodia*



THE SOLOMON ISLANDS is a small Pacific island nation that has made great strides in reducing its malaria problem. The National Malaria Control Programme was reorganised in 1992 to form a dynamic partnership between communities, government health programmes, NGOs and international agencies which could implement an innovative mixture of control strategies in the Solomon Islands. Such partnerships are the lifeblood of Roll Back Malaria.

FOLLOWING INDEPENDENCE in 1978 the number of malaria cases increased each year so that by 1992 malaria had become an intolerable burden. In that year alone there were 153,359 confirmed cases among a population that was then estimated to be 350,000. This translated into an annual malaria incidence of 440 per thousand population, making the Solomon Islands one of the most malarious countries in the world outside Africa. Most alarming was the fact that in 1992 Honiara, the national capital, experienced an annual malaria incidence of 1,072 cases per 1,000 population.

IN 1993 WITH STRONG community and government commitment, the whole concept

of malaria control in the Solomon Islands underwent drastic change. New, realistic targets were set, control strategies that put more emphasis on community participation were selected, a programme for retraining health staff was put in place and commitment for support was obtained from international partners. Most important was the realisation that malaria was a shared responsibility for all parts of the community.

WITH COMMITMENT, support and a lot of hard work, the Solomon Islands has reduced its malaria burden. From a staggering figure of 153,359 cases in 1992 the total dropped to only 63,853 in 1998, a reduction of 59 per cent. Now nearly 60 per cent of families sleep under insecticide-treated nets that are distributed, re-treated, replaced and, in some areas, sewn by communities themselves.

IN THE VILLAGES with a continuing malaria problem, spraying of house interiors with insecticide is done with the full cooperation and support of the communities involved. Quality diagnosis has been extended to rural clinics using community volunteer microscopists so that even people

living in remote areas can get a quick and accurate diagnosis when they are sick.

IN HONIARA, a team of malaria workers makes weekly household visits, looking for and treating fever cases and distributing insecticide-treated nets. Drugs for treating malaria are readily available through all health facilities and pre-packaged drugs have been introduced that help patients understand what tablets to take and for how long, thereby improving compliance and reducing the problem of repeated attacks.

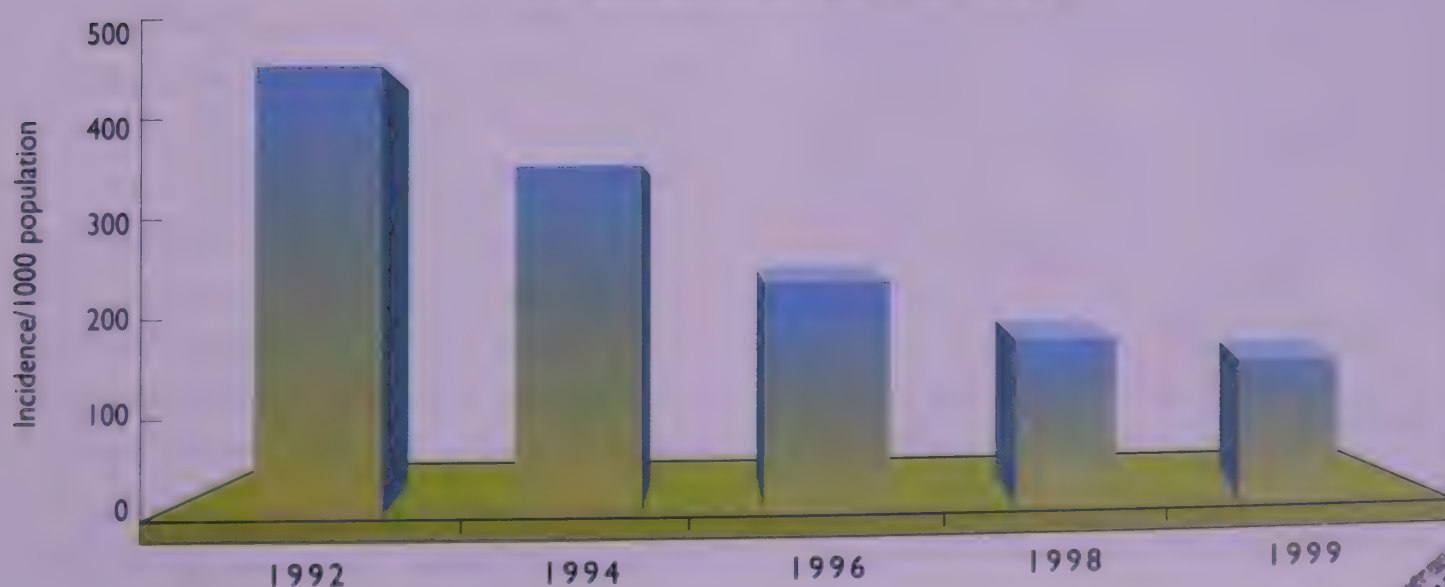
COMMUNITIES ARE NOW able to see the tangible results of their efforts. Families that always had one or more members sick with malaria report that they now experience fewer and fewer malaria attacks. There is no

longer any need for frequent trips to take a sick child to the health centre or hospital for treatment. There is strong feedback from political and community leaders citing malaria control as a health programme that has made a major impact and shown the way for the rest of the health care system.

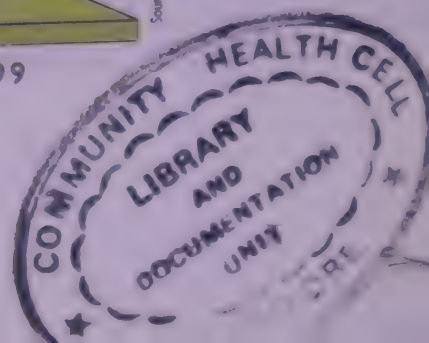
THE PEOPLE of the Solomon Islands are proud of what they have accomplished although they and their leaders are aware that in order to sustain their achievement, while at the same time further reducing the islands' malaria burden, continued commitment and support will be required.

*Information provided by Kevin Palmer,
WHO, Philippines*

EFFECTIVE INTERVENTIONS REDUCE MALARIA INCIDENCE IN THE SOLOMON ISLANDS



Source: R. Velupillan, WHO, Honiara, Solomon Islands



THE MAIN PROBLEMS facing malaria control in the Mekong Region – multi-drug resistance, the concentration of malaria in ethnic minorities and migrants who have little or no access to formal health services — are being tackled by a new Roll Back Malaria project.

THE PROJECT, a joint effort by UNICEF and WHO, will help reinforce the work of national programmes, health services, malaria control partners and other sectors to reduce the malaria burden among the 144 million population at risk in the region. Its ultimate objective is to reduce regional malaria mortality by at least 50 per cent in 2010 compared to 1998 and to substantially

reduce the incidence of malaria.

THE INITIATIVE followed a meeting hosted by the Government of Viet Nam in March 1999 and which brought together representatives of the governments of Cambodia, China (Yunnan Province), Lao People's Democratic Republic, Myanmar, Thailand and Viet Nam, along with UNICEF, UNDP, WHO, the European Commission, bilateral organisations and various NGOs.

RECOGNISING the remarkable similarities in the social, economic and malaria problems faced by the six Mekong countries, the meeting concluded that there was a need to improve health services in remote areas through strengthening community-based services and improving the practices of the commercial sector; that although impregnated bed nets are already widely used in isolated communities their use needs increasing; and that communication between communities and countries needs strengthening.

SINCE THE MEETING UNICEF and WHO have consulted with health authorities, and malaria specialists in the six countries as well as other main partners in the region to produce a two-year RBM plan of action. This





is based on the application of new interventions and their adaptation to local situations. Great emphasis is now being placed on training of village health workers with a package of basic prevention and curative care that takes into account the region's most important health problems, especially among young children and pregnant women.

DELEGATES ALSO recognised that technical advances may completely change

the face of malaria control in the Mekong countries. For example, new, rapid diagnostic tests and standardised pre-packaged combination treatment for multi-drug resistant falciparum malaria have a major potential to provide rapid diagnosis and prompt treatment, particularly in the region's remote and border areas.

Information provided by Peter Trigg and Charles Delacollette, WHO, Switzerland



RAPID DIAGNOSIS AND TREATMENT: HOME IS THE FIRST HOSPITAL

A SIMPLE PACKET OF EFFECTIVE MEDICINES AVAILABLE TO PARENTS AND COMMUNITY WORKERS CAN SAVE CHILDREN WITH MALARIA. MUCH CAN BE ACHIEVED WITH RAPID DIAGNOSIS AND TREATMENT AT HOME.

ROAD MAPS FOR *C*OMMUNITY ACTION

ZAMBIA

AS THE BATTLE to control malaria continues, a dramatic shift towards community work is taking place in the Eastern Province in Zambia. The work is based on the realisation

that the most important health decisions are made in the home and, that to achieve a sustainable decrease in suffering and deaths, ways of working beyond the traditional focus of facility-based services must be sought. These include efforts to develop “road maps” or tools for moving into this new realm of households.

THROUGH THE Eastern Province Integrated Malaria Initiative communities and caretakers are coming together, identifying problems and working out how they can best tackle them together. The initiative, which covers three districts with a total population of 70,000, is developing tools and strategies for community action which will help societies understand and improve on issues such as “caretaker recognition” and how to seek treatment for a variety of diseases, including malaria. The critical link between



communities and health centres is also being studied and reinforced by creating partnerships which plan projects together.

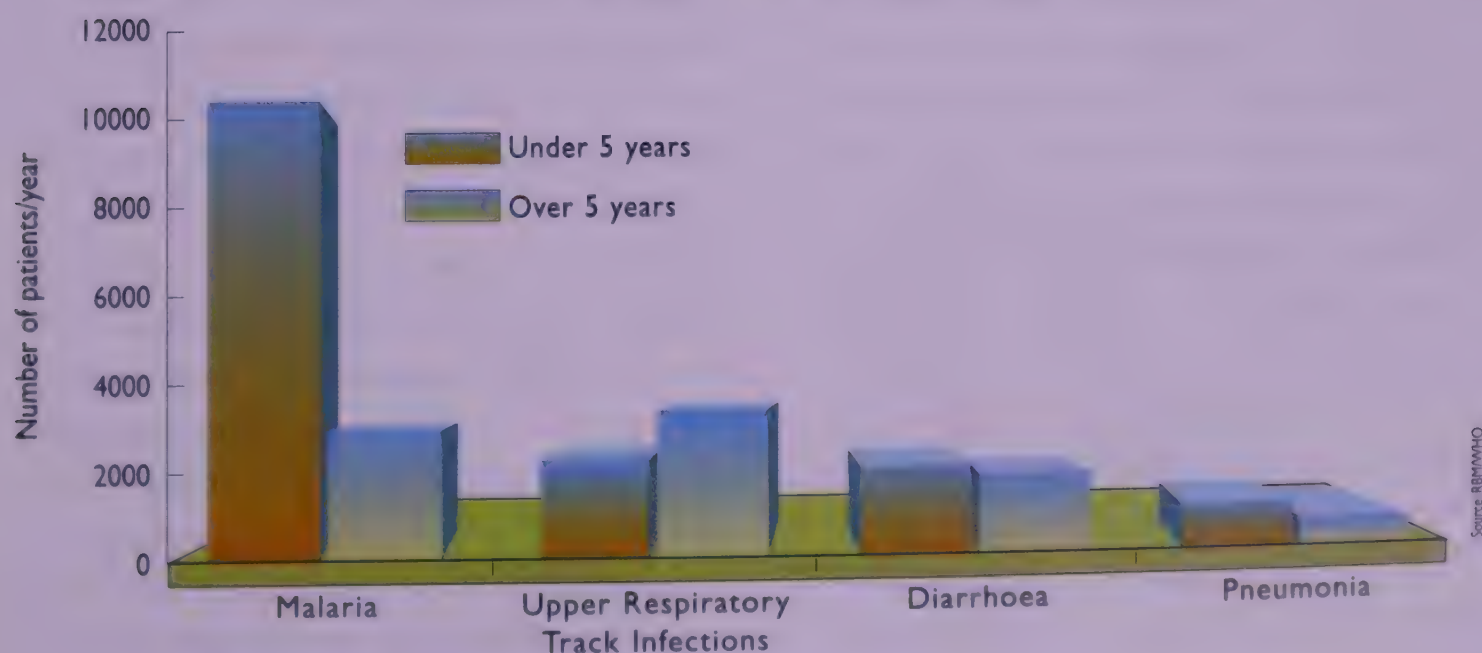
MEANWHILE, efforts are being stepped up to improve the health of children and families through the Integrated Management of Childhood Illnesses (IMCI) initiative and the introduction of insecticide-treated nets. The initiative, which received initial support from the USAID BASICS project, has already developed protocols to: help investigate illness terminology and taxonomy; understand the timing, content and sequence of seeking care; and study the quality of care

at health facilities, informal providers, pharmacists and drug vendors.

THE INITIATIVE discovered that mothers were attuned to their children's condition and reported changes, such as irritability or loss of appetite, before illness manifested itself. Fever was well recognised, and the anti-malarial chloroquine was the preferred treatment. The problem, however, lay in dosages – usually partial doses were given, although overdosing was not uncommon. Dramatic performance differences were noted in health workers trained in IMCI.

INFORMATION on terminology and

MALARIA IS THE PRIMARY CAUSE OF HOSPITAL OUTPATIENT ATTENDANCE IN ZAMBIA'S EASTERN PROVINCE
(Three hospitals in Petauke District, 1996)





treatment practices was fed into the Community Partnership Programme, which helped communities and the local health centres identify health problems and develop a particular emphasis on strengthening the system by ensuring that antimalarials such as Fansidar and IM Quinine were available, as well as counselling to improve use of services. There were dramatic increases in both areas: the percentage of facilities with stocks of Fansidar increased from 44 to 71 and those with IM Quinine from 25 to 63.

THERE WAS ALSO a dramatic increase in service utilisation with the average number of new consultations per month in each of 23 health centres increasing from 326 to 600. Finally, Eastern Province has begun the introduction of bednets through

local NGOs, rural health centres and commercial outlets.

TODAY, THE INITIATIVE is taking hold, and “road maps” have developed as malaria programmes begin to move into this new territory of home and community-based activities. Zambia’s Eastern Province is helping show the way, and some of the pitfalls, by developing and documenting tools and strategies for the four essential elements of a community-based initiative: caretaker recognition and response, community partnerships, improved curative services through IMCI and improved prevention through the availability of ITN services.

*Information provided by
Michael McDonald, BASICS, USAID, USA*



DYNAMIC MOVEMENT WITH INTERSECTORAL ACTION

SCHOOLS, ENVIRONMENTAL GROUPS AND OTHER SECTORS OF THE SOCIAL INFRASTRUCTURE JOIN IN THE SYNCHRONISED EFFORTS TO ROLL BACK MALARIA FORGING, AT THE SAME TIME, A DYNAMIC GLOBAL MOVEMENT.

HOW *S*CHOOLS HELP MALARIA CONTROL

SENEGAL

IS MALARIA ONLY a health problem? Is malaria control the job of the health sector alone? When reflecting on the huge scale of malaria, many countries in Africa are beginning to ask these questions.

IN SENEGAL, the government is trying to ensure that all children have access to quality, basic education. The planners know from experience – and from needs assessment – that they will have to build more schools, train more teachers and improve the facilities that already exist. They also know that a successful programme will provide many of the poorest and most disadvantaged children with their first chance to go to school.

THESE CHILDREN will also be the most malnourished and the most likely to suffer ill health. Will this mean that the children are too ill to attend school regularly and too

distracted to learn properly while there? The government team thinks so, and has decided to develop a School Health, Nutrition and Hygiene component as an integral part of its “Education For All” strategy.

“**THE SCHOOL** health programme aims to improve learning and educational outcomes through improved health and nutrition. The primary goal is educational,” says Professor Malick Sembene, the mastermind behind this school health strategy. Turning this vision into a reality requires a careful dialogue between the sectors, particularly health and education, and the construction of a *Protocole D’Accord* that carefully outlines the responsibilities and duties of the many partners involved. Roll Back Malaria identifies “absenteeism from school” and “reduced learning ability” as key developmental consequences of malaria.



"**IN SENEGAL**, there is anecdotal evidence of seasonal malaria playing an important role in keeping children out of school in some regions," says Dr Tankari, the local WHO Representative. But it is unclear whether the issue is important enough to make malaria control a priority for the school health component. In order to find out, the school health team is joining a study, supported by the World Bank's International School Health Initiative and RBM.

TEAMS FROM EAST and West Africa have been evaluating the impact of malaria on schoolchildren using surveys of published literature and analysis of primary data.

These analyses build on work initiated with Wellcome Trust financial support.

SENEGAL'S commitment to the initiative represents a step forward in improving school attendance and promoting development in a country with endemic malaria. "There are no agreed guidelines for dealing with malaria in schoolchildren. We don't even know for sure that it is a problem. So this initiative is an essential part of our developing an effective evidence-based school health programme for Senegal," says Professor Sembene.

*Information provided by Donald Bundy
and Lesley Drake, World Bank, USA*

AN ENVIRONMENTALLY-FRIENDLY APPROACH TO MALARIA CONTROL

MADAGASCAR

MADAGASCAR LIES on the south-east of the African continent. Its tropical climate and lush vegetation allows malaria mosquitoes to proliferate. Half the island's population lives in highly endemic areas and the other half in territories prone to severe epidemics.

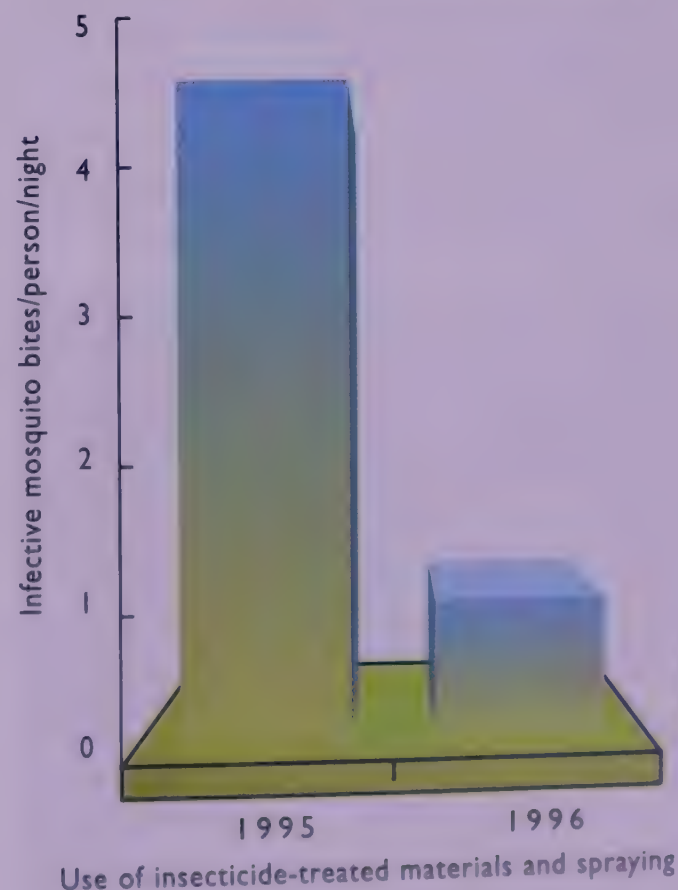
MALARIA HAS ALWAYS been among the leading causes of death in Madagascar (8 per cent of all deaths in 1987). In 1992, the World Bank made a significant investment in control activities through its First Health Sector Support Project. About a third of the total credit of US\$ 31 million went to malaria control as part of the project's infectious disease prevention and management component.

A CAREFULLY SELECTED combination of control strategies has helped reduce malaria illness and deaths. The successful use of indoor spraying and insecticide-treated curtains and nets was a major breakthrough. Equally important was the need for case management and the establishment of an epidemic alert system. In 1993 indoor spraying with DDT began in the Madagascar highlands covering approximately 66,000 square kilometres and a population of about

2,6 million. The impact of these measures was critical in helping reduce malaria occurrence by 0.8 per cent in the areas where indoor spraying took place compared to 6.5 per cent in other areas.

IN THE REGION of the Alaotra Lake in Mahakary, efforts to fight the disease

**DECLINE IN INFECTIVE
MOSQUITO BITES
IN ALAOTRA, MADAGASCAR**



focussed on the use of impregnated curtains and household spraying. A study conducted in the region showed that the number of infecting mosquito bites per person per night decreased from 4.76 in 1995 to 1.0 in 1996 by applying these measures.

ALONGSIDE THE WORK on malaria control, viable alternatives to the use of DDT were sought. The use of DDT, particularly in agriculture, had drawn attention from the international community, environmental groups and NGOs. In the light of these considerations the local scientific committee involving the Ministry of Health and various institutions actively pursued research on alternatives to DDT.

STUDIES on the efficacy of an insecticide named lambda-cyhalothrin convinced the

authorities that the new compound was as effective as DDT at roughly the same price and without any drawbacks. In 1998 the World Bank and the Madagascar government agreed to change strategy by adopting environmentally-friendly insecticides for its malaria control programme. The impact of the programme will be monitored and evaluated with the Bank's financial support. Outbreak control and epidemiological surveillance in the highlands has been strengthened and a more complex and thorough strategy for other malaria endemic zones was adopted.

ONE OF THE TOP priorities of the new strategy is to focus on malaria control in groups at risk, such as pregnant women and children. Equally important is the need to ensure adequate treatment of severe and complicated malaria cases. As much as 27 per cent from the World Bank's Second Health Sector Support Project (US\$ 40 million scheduled to be launched in April 2000) will go towards purchasing pyrethroids and insecticide-treated bednets. Strategic decisions on spraying, bednet policy, and choice of medicines will be taken under the guidance of the RBM committee in Madagascar.

*Information provided by Sandii Lwin,
Jean-Pierre Manshande and Ioan Luculescu,
World Bank, USA*



FORGING *L*INKS WITH OTHER SECTORS

GHANA & SENEGAL

THE HEALTH IMPACT of other activities such as deforestation, agricultural development, dams and irrigation schemes can all trigger outbreaks of malaria by creating new habitats for mosquito breeding and by increasing the contact between the non-immune population and malarial parasites. Health impact assessments incorporated with appropriate risk management measures in these sectors can identify opportunities to reduce malaria.

THE CRITICAL LINK between the environment and health has been addressed in two World Bank projects. In Ghana, where malaria is still the number one infectious disease, WB has set up a pilot study within its Urban Environmental Sanitation Project. This study aims to produce examples of inter-sectoral collaborations including guidelines to identify, evaluate and prioritise health problems – including malaria – outside the health sector and based on “burden of disease” assessments.

IN ANOTHER PROJECT in Senegal, efforts to incorporate health objectives within the Long-Term Water Sector project has helped identify malaria as a key issue. At

the moment, in the capital Dakar, market gardening practices which use water in abundance can favour malaria mosquito breeding all year round. Efforts are being stepped up to ensure that better irrigation methods using the “drip irrigation” model will reduce mosquito breeding.

THE INTERSECTORAL approach to reducing the malaria burden will require the health sector to assume a regulatory role, with environmental health departments working closely with malaria control programmes. Health impact assessments, if included in existing environmental impact assessments, represent the most cost-effective way to address malaria.





RISK OF MALARIA TRANSMISSION IN INFRASTRUCTURE PROJECTS

PROJECT TYPE	RISK OF INCREASING MOSQUITO BREEDING SITES	RISK OF MALARIA TRANSMISSION
Roads	High	High
Logging	High	High
Urbanisation	Initially high, then low	Initially high, then low
Irrigation (rice/sugar)	High	High to Low
Irrigation (canals)	Low to High	Low to High
Energy (dams, pipelines)	High	High
Water supply	Moderate	Low to moderate

Source: WB 1999

Adapted from an article prepared for HDNewsNotes "Identifying opportunities to address malaria through infrastructure projects: Workshop Report", 1999, World Bank, USA



COORDINATED ACTION:

CHILDREN AND WOMEN AT CENTRE STAGE

A COMMON STRATEGY FOR ROLLING BACK MALARIA IS PROPOSED
AND WELL-COORDINATED ACTION IS CARRIED THROUGH.

INTENSE EFFORTS *L* EAD TO EFFECTIVE CONTROL

KENYA

THE SIAYA REGION on the shores of Lake Victoria in Kenya is one of the worst malaria-endemic regions in the world. Everyone living there receives an estimated 300 infectious bites a year – almost one a day. Prevalence rates are more than 50 per cent and the local malarial parasite is highly resistant to chloroquine, the most commonly-used drug.

AS USUAL it is pregnant women and children who suffer most. Infant and under-five mortality rates here are twice the national average and malaria accounts for 16 per cent of children's deaths. Limited health facilities and poor roads force mothers and children to walk up to 15 kilometres for diagnosis and treatment.

SINCE 1995 CARE has been helping these mothers and children through its Child Survival in Siaya project, already operational in 23 locations and expanding to 40 over the

next three years. The project has set four goals: increase the proportion of households with impregnated mosquito nets; increase the proportion of mothers and children who sleep under them; persuade mothers to take medicines to protect their unborn children; and to ensure that sick children are bought for treatment within 24 hours





of the onset of malaria symptoms.

UNICEF'S BAMAKO initiatives project is also helping by using local pharmacies to train health workers in the early recognition and treatment of malaria and in particular the importance of referral in children under five. To combat chloroquine-resistance, single doses of Fansidar and paracetamol were used and, for the first time in Kenya, community health workers and village health committees were trained to dispense Fansidar for malarial treatment and for presumptive use in pregnancy. Studies over the past two years show that their clinical proficiency has been commendable.

THE HEALTH WORKERS were also trained in the environmental control of malaria, particularly in the use of bednets. Pharmacies were supplied with bednets – a total of 11,500 over six months in 1997 – and non-DDT insecticides for re-treatment.

PROBLEMS REMAIN. A 1999 study showed that bednet use had only increased eight per cent over the course of the project – mainly due to the cost of nets and re-treatment. In response, subsidies were introduced to cut the cost of bednets from six to four dollars and an instalment payment plan has been introduced.

SPECIAL COMMUNITY DAYS for multiple bednet re-treatment were introduced and publicised through the pharmacies and chiefs' meeting days. Over the next four years an aggressive information, education and communication campaign will further increase community acceptance and use of treated nets. Women's groups and school programmes are also being used as vehicles for increasing net use.

*Information provided by
Grace Miheso, CARE, Kenya*



FOCUSSED RESEARCH

COOPERATION ACCELERATES THE AVAILABILITY OF EFFECTIVE MEDICINES, INSECTICIDES AND DIAGNOSTICS THROUGH WELL-DIRECTED AND FOCUSSED RESEARCH.

PROVIDING FINANCE FOR *M*ALARIA MEDICINES

OVER THE LAST two decades we have learnt the hard way that malaria is an ever-moving target. The parasite which causes malaria adapts to survive and we must always be one step ahead if our goal is to reduce disease suffering and death. The race is on to find new cost-effective tools which can be used, not only to treat malaria, but to improve its diagnosis.

THE NEED FOR MALARIA prevention and the spiralling rate of resistance to first-line antimalarial medicines could be reduced by an effective vaccine. But the challenges of vaccine development are formidable. Control requires new drugs but the industry has little incentive to invest in research and development for new, affordable drugs.

IF SOMETHING is not done soon, then we could be faced with a real emergency in the not-too-distant future, where malaria would become untreatable because of lack of drugs.

THIS PROBLEM has now been recognised by both public sector agencies and industry together with the critical need to settle on

some ambitious, yet realistic, goals. This has led to what has become the Medicines for Malaria Venture (MMV) – a joint initiative by public and private sectors to develop new antimalarial medicines for use in developing countries.

MMV'S MISSION statement is: "Through public/private partnership to foster and finance the discovery and development of new, affordable antimalarial medicines to regulatory approval at a rate of one new registered product every five years and to facilitate their commercialisation."

THE CHALLENGE is how to realise this goal. To establish this goal the public sector wanted assurances that industry would fully engage in any venture and to ensure that any new efforts would be compatible with other malaria initiatives. Similarly, industry required a strong competitive element in any proposal and flexible entry and exit mechanisms for the companies involved. Assurances also needed to be made that there was no risk of setting

precedents that would adversely affect core business interests. It has been agreed that:

- Industry would provide background technologies and expertise, e.g. access to chemical compounds and high throughput screening which is worth millions of dollars.
- Most of the finance for any venture should come from the public sector, through the establishment of a "public venture capital fund" that would finance malaria drug discovery projects, usually linking academic groups to individual companies.
- The venture should operate as a not-for-profit business.

THE MMV INITIATIVE received a critical boost with the arrival of Dr Brundtland at WHO and the establishment of the Roll Back Malaria partnership. A series of roundtable discussions with the pharmaceutical industry supported the process and MMV has become an integral part of Roll Back Malaria.

MMV HAS RECENTLY BEEN established as an independent foundation, although still closely linked to WHO. It has received funding promises of over US\$ 8 million and has selected its first three drug projects from over 101 applications. The projects involve



major pharmaceutical companies and this, at a stroke, has increased industry engagement in malaria R&D.

THE GOAL OF MMV over the next few years is to increase funding to US\$ 30 million a year to develop a portfolio of projects that will

deliver one new antimalarial drug every five years. The challenge that lies ahead, however, is not only to discover and develop new antimalarial medicines, but to ensure that they are relevant to the needs of populations exposed to the disease. This means making medicines affordable, cost-effective and accessible to those who need them most.

THE LAUNCH of MMV is a successful example of harnessing greater public and private sector collaboration to produce new antimalarial products for developing countries.

MMV's major donors and sponsors include: RBM, WHO/TDR, IFPMA, Global Forum for Health Research, WB, Rockefeller Foundation, Netherlands Minister for Development Cooperation, Swiss Agency for Development and Cooperation and DFID.

*Information provided by Robert Ridley,
WHO, Switzerland*

PROTECTING AGAINST *C*OUNTERFEIT MEDICINES

IT IS A PUBLIC health hazard whose soaring profits are directly linked to the suffering and death of the developing world's most vulnerable victims. The issue is drug counterfeiting, and how this US\$ 21 billion industry is already claiming the lives of malaria victims whose health, livelihoods and families would have been spared with proper antimalarial drugs and the necessary controls.

THIS BURGEONING PROBLEM poses a serious threat, not only to the health of those living in malaria-affected countries, but also to the developed world through the global phenomenon of drug resistance. Drug resistance is exacerbated by the misuse and abuse of antibiotics dispensed at levels lower than treatment guidelines dictate.

BETWEEN 1992 AND 1994, as many as 51 per cent of counterfeiting cases uncovered by WHO (70 per cent of which were in developing countries) revealed that "knock-off" drugs carried no active ingredient whatsoever. Yet another 17 per cent of counterfeits contained the wrong ingredient, while an additional 11 per cent contained weaker than recommended

concentrations of the active medication. Today, no one knows for sure to what extent the problem of counterfeiting has grown or spread. What is clear however, is that, in the wake of globalisation and the increasing power of organised crime, the problem is becoming even more acute.

IN PARTNERSHIP with the German Pharma Health Fund – a non-profit NGO – WHO's Roll Back Malaria and the Essential Drugs and Medicine Department (EDM); a new quality assurance product has just been approved and will shortly be distributed free to eight African nations participating in the counterfeit research study. Furthermore, the introduction of this new "minilab" – costing some US\$ 3,000 per unit – will also help in identifying counterfeit sources of anti-malarials. This new initiative could be a small step toward ensuring not only drug access for all, but that available antimalarial medications meet basic diagnostic guidelines regardless of where and how they have been purchased.



*Information provided by
Murtada Sesay, WHO, Switzerland*



EVIDENCE-BASED DECISIONS:

FIRST-LINE DEFENCE

MALARIA OUTBREAKS ARE IDENTIFIED USING THE LATEST COMPUTER TECHNOLOGY SYSTEMS WHICH HELP CONTRIBUTE TO EVIDENCE-BASED DECISIONS AND EFFECTIVE RESPONSES.

*S*URVEYING EPIDEMICS AND OUTBREAKS

INDIA

INFORMATION COMES before targeted action and an efficient information system is an essential component of the health system of any country, especially those at risk of infectious epidemics.

A **SIMPLE MALARIA** surveillance system, based on the established benefits of Geographical Information Systems (GIS), has been designed to support malaria control in Dindigul, Tamil Nadu, southern India. The system was formally inaugurated on 19 November 1999 to mark World GIS Day.

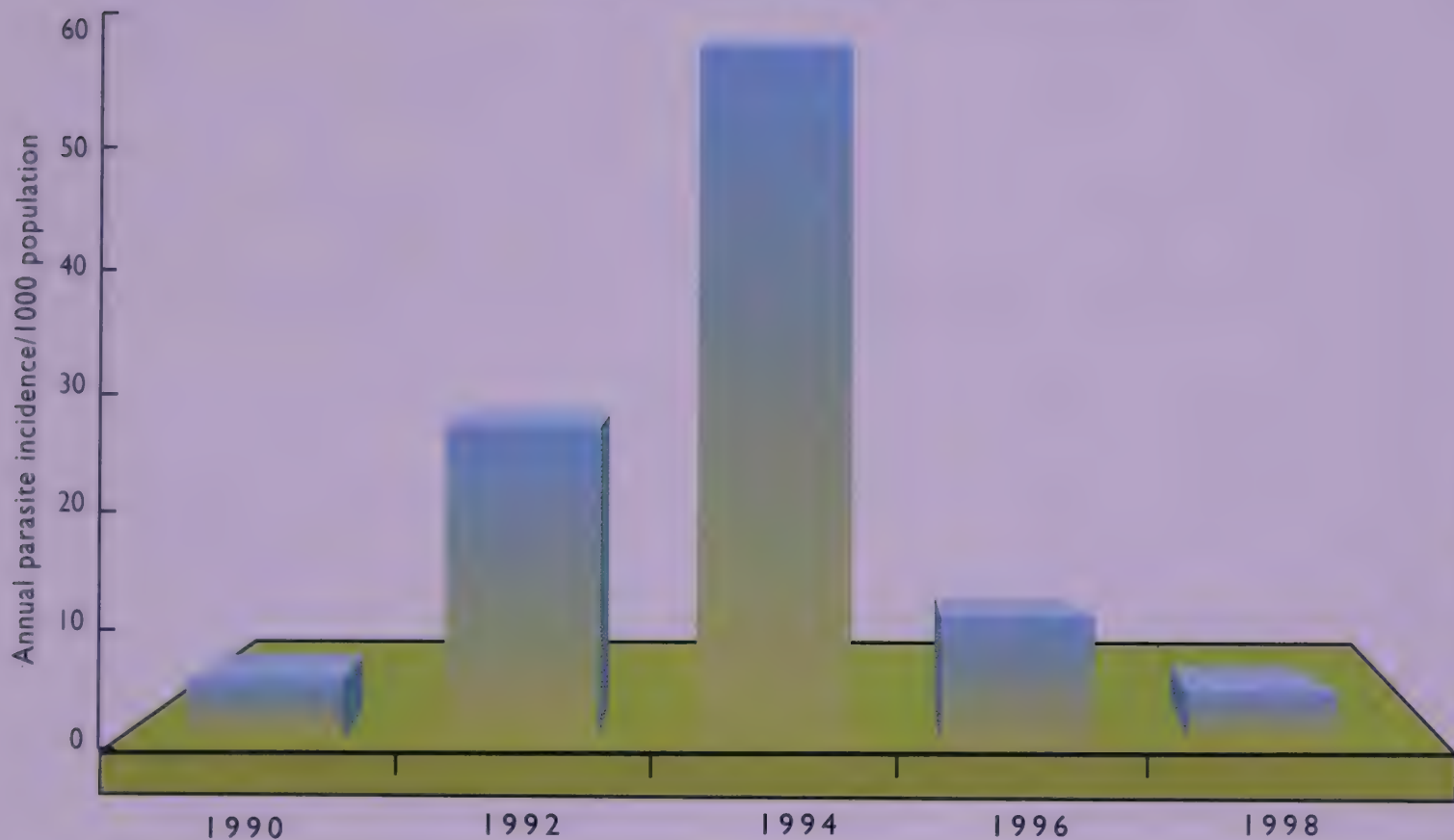
GIS SYSTEMS are prized for their ability

to manage both spatial and non-spatial information. They facilitate inputting, storage, processing, integrating, analysing and presentation of data. One unique aspect of GIS is its ability to overlay a series of maps and integrate data from any source such as remote sensing, aerial photographs, ground surveys or reports.

ONCE THE FOUNDATIONS of a GIS database have been laid, it can be used for surveillance, mapping malaria cases, identifying disease determinants and areas of high risk. Also, the basic structure of the



MALARIA INCIDENCE IN DINDIGUL



Source: Malaria Research Centre, Delhi, India

system, once constructed, can be used for any other locally prevalent disease such as filariasis or dengue, by retaining the basic map and general information and adding prevalence and risk factors specific to the disease being monitored.

WITH A GIS SYSTEM in place, any localised outbreak can be rapidly linked to problem breeding sites, a specific vector or a possible human source so that swift and effective action can be taken.

SCIENTISTS AT THE Malaria Research

Centre (MRC) at Delhi, the local MRC field unit and the State Public Health Department assisted in setting up the system. Although its benefits cannot be quantified for another six months, plans are already underway to extend the system into other malarious districts of Tamil Nadu to allow them to achieve cost-effective and rapid malaria control.

*Information provided by Aruna Srivastava,
Malaria Research Centre, India*



MULTIPLE PREVENTION: **INNOVATIVE METHODS**

**MOSQUITO NUMBERS CAN BE REDUCED BY THE RIGHT MIX
OF CONTROL METHODS FOR THE LOCAL SITUATION.
THIS CONTRIBUTES TO BETTER MULTIPLE PREVENTION OF MALARIA.**

CATTLE-SPONGING CUTS *M*OSQUITO NUMBERS

LIVESTOCK KEPT by farming families in South and West Asia are thought to be largely responsible for the high mosquito densities in the region. A new study conducted in Pakistan has demonstrated the effectiveness of treating cattle with insecticide, or “cattle-sponging”, on malaria incidence.

THE RESEARCHERS were prompted to

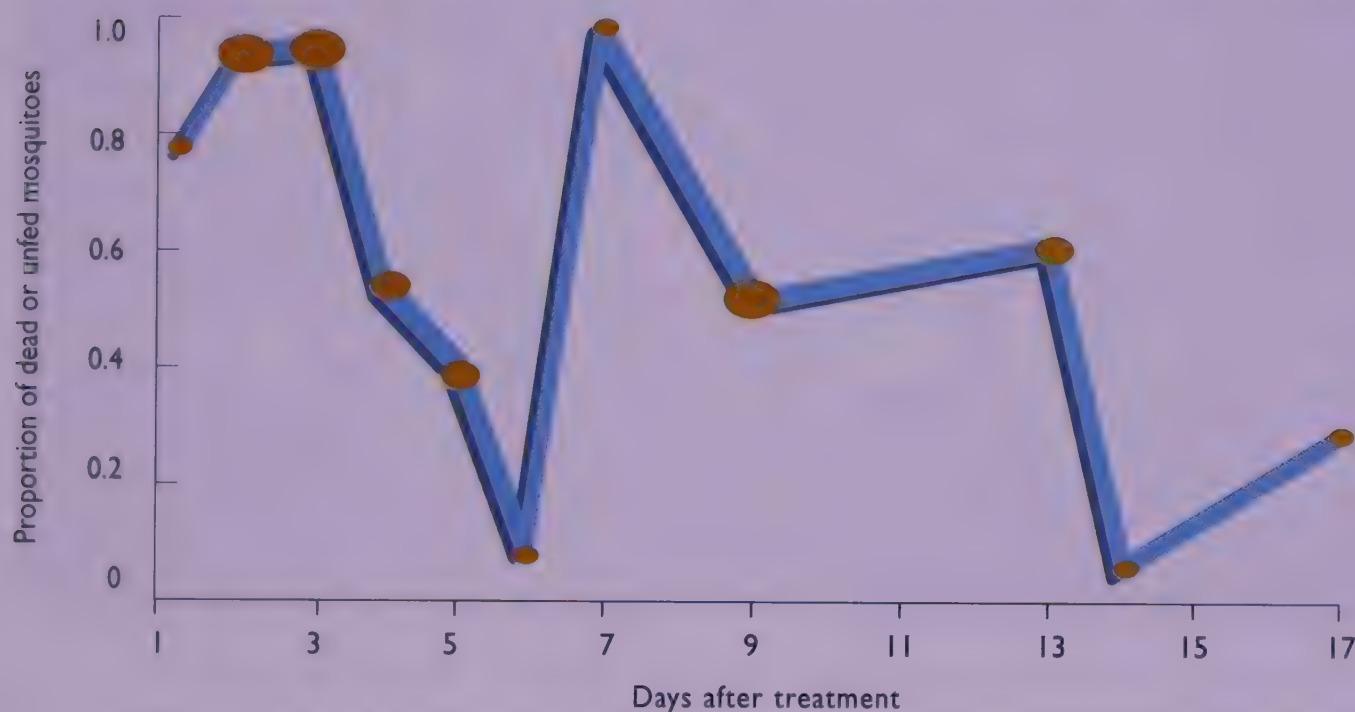


find a more economic, effective and socially acceptable alternative to the region’s principal method of malaria control – indoor residual spraying. Their results have shown particular promise for regions where insect vectors are high zoophilic.

THE EFFECT of treating cattle with insecticides had already been demonstrated in earlier studies, but when these were conducted the available treatments had to be re-applied every ten days and the strategy proved impractical. However, modern insecticide formulations, with their better adherence, low mammalian toxicity and high insecticide protection might make the difference.

ANOTHER INNOVATION was to abandon attempts to protect the cattle with insecticidal eartags. Analysis of this technique had shown that the resulting insecticide deposits from tags tended to be heaviest on the head, neck

CATTLE SPONGING WITH THE INSECTICIDE DELTAMETHRIN KILLS ANOPHELES MOSQUITOES AND PREVENTS THEM FROM FEEDING



(The size of each data point reflects the number of assays on which it is based (max 4, min 1))

Source: Adapted from the original: M Rowland et al.
London: School of Hygiene and Tropical Medicine, UK

and upper forelegs of the cattle, while 90 per cent of mosquitoes fed from below the cow's mid-line. Although a walk-through dip might have been the most appropriate technique, animal sponging was held to be the easiest, cheapest and most convenient means of application that could be used, especially by refugee cattle-owners.

THE EXPERIMENT used both grazing and sheltered cows, investigated the effects of different insecticides and concentrations, and the technique was designed to simulate natural conditions as closely as possible,

allowing the mosquitoes themselves to choose whether to settle on the animals. During the test nights two men sat next to tethered cows, conducting mosquito landing catches on one another to investigate the possibility that the insecticide treatment might divert mosquitoes from cattle to men resting nearby.

RESULTS SHOWED that livestock-sponging can reduce malaria transmission just as much as indoor spraying and that the majority of the mosquitoes affected by the insecticide were killed before feeding. The effect was greatest in sheltered cows and no diversion of hungry



mosquitoes from the treated cattle to nearby humans was recorded.

AS WELL AS providing malaria protection there are likely to be additional benefits from animal sponging. Biting flies and the parasites they carry reduce the health and productivity of livestock and transmit diseases such as babesiosis, anaplasmosis and theileriosis, all of which are present in the locale of the trial.

ALTHOUGH IT IS NOT yet possible to estimate the effect that cattle-sponging might have on malaria transmission these results show great promise and, in a paper published in *Tropical Medicine and International Health*, the researchers have called for a full-scale

village evaluation. They suggest that a campaign-style approach, in which all the community cattle are treated at the same time with deltamethrin, the most promising of the insecticides tested, would have the maximum effect. They also suggest that late July, when the monsoon rains arrive, humidity increases and malaria transmission gets underway, would be the most appropriate time for any cattle-sponging campaign.

Adapted from an article "Control of zoophilic malaria vectors by applying pyrethroid insecticides to cattle" by

*Sean Hewitt and Mark Rowland
published in Tropical Medicine
and International Health, 4, 481, 1999*



GLOBAL MOVEMENT: LOCAL ACTION

SYNCHRONISED EFFORTS TO REDUCE MALARIA SUFFERING AND DEATH
ARE BACKED BY NATIONAL AND INTERNATIONAL PARTNERSHIPS.
THIS CONSOLIDATES A DYNAMIC GLOBAL MOVEMENT.

W

ORKING IN HARMONY TO MEET LOCAL NEEDS

AMAZONAS

COMPLEX FACTORS affect malaria control in Latin America. Although malaria is endemic in 21 countries the risk varies greatly from area to area, depending on population movement, social stability and the level of community action taken to prevent the disease and protect against mosquitoes.

THE REGION FACES two particular problems – the settlement of primitive jungle areas by fortune hunters and developers, and poor health care for the large population in rural areas and in the poor outskirts of the large cities.

THERE HAS BEEN massive migration of people with no malaria immunity from coastal areas into the interior in search of gold and other wealth. In the jungle areas the malarial situation is rapidly deteriorating as populations with different immunity levels are mixed and move around. Meanwhile, rainforest clearance and open-cast mining are destroying the

natural environment and creating new breeding grounds for mosquitoes.

THE INDIGENOUS PEOPLES of the region are particularly disadvantaged by the turmoil caused by the pursuit of economic opportunity. Cultural and geographical isolation presents problems in providing health care and education for indigenous peoples while conservationists worry about





the impact that western ideas and influence, even when provided for humanitarian reasons, will have on their culture.

IN PERU, for example, nearly 50 per cent of notified malaria cases came from one of two subregions inhabited by Peruvian indigenous people. In the Amazonas state of Venezuela malaria is the seventh cause of mortality, even though it is not included among the ten leading causes at national level.

A DELEGATION of nine South American countries met recently in Lima to share ideas and strategies for controlling tropical rain-forest vector-borne diseases and to develop a joint plan to improve the health care of the people living in their forest areas. International, multinational and bilateral agencies as well as NGOs attended the meeting which set out to create an adaptable strategy that could meet a variety of

situations and specific local needs.

ROLL BACK MALARIA was introduced to the meeting as an integrated strategy which could tackle the malarial problems of the people of the Amazonian region. The strategy was endorsed by all nine participating nations. RBM will now reinforce the Global Malaria Control Strategy in the Americas, which has been in operation since 1992. RBM emphasises the importance of social movements for better health sector reinforcement and new moves will stress an integrated approach, including Integrated Management of Childhood Illnesses (IMCI) to tackle child mortality.

LINKING IMCI to RBM will strengthen the delivery of health prevention and control activities at the community level. Training indigenous people as health workers will build local capacity to prevent and treat malaria and instruct on caring for the sick at home.

ONE EXAMPLE of a health care programme that targets indigenous people in inaccessible areas is now taking place in Venezuela's Amazonas state where malaria is out of reach of traditional control measures. Although this area has only 0.3 per cent of Venezuela's population, it accounts for 12 per cent of all malaria cases. The leading cause of mortality for the indigenous Yanonami population, here and in Brazil, is malaria.

WITH THE YANONAMI PEOPLE RBM is promoting the use of impregnated bednets, evaluating the impact of their use on both the communities themselves and on malaria morbidity. In an effort to respect and incorporate indigenous culture in the process the Yanomani people themselves selected the shape for their bednet design.

THE LIMA MEETING also recognised that the most important strategy for malaria

in the Americas was transmission control and PAHO/WHO suggested two methods – Selected Control of Malaria Vectors and the Plan for Simultaneous and Intensive Activities. These are new, simplified techniques that emphasis simultaneous actions to reduce the amount of carriers of the diseases among humans and mosquitoes.

EPIDEMIOLOGICAL SURVEILLANCE, another RBM keystone policy, was endorsed as a vital tool to orientate disease control and define health policies. New demographic and epidemiological data needs to be collected for the marginalised peoples of South America – indigenous peoples, border communities, miners and forest workers, who are exposed to the highest risk of malaria.

*Information provided by
the Pan American Health Organization, USA*



A B B R E V I A T I O N S

ACTED:	Agency for Technical Cooperation and Development	ITN:	Insecticide-Treated Nets
AMREF:	African Medical and Research Foundation	MERLIN:	Medical Emergency Relief International
API:	Annual Parasite Incidence	MRC:	Malaria Research Council
AUSAID:	Australian Agency for International Development	PAHO:	Pan American Health Organization
CARE:	Co-operative for Assistance and Relief Everywhere	SPC:	Secretariat of Pacific Community
DDT:	Dichloro-diphenyl-trichloroethane	UNDP:	United Nations Development Fund
DFID:	Department for International Development (UK)	UNICEF:	United Nations Children's Fund
ECHO:	European Commission Humanitarian Office	USAID:	United States Agency for International Development
GIS:	Geographical Information System	VBDCP:	Vector Borne Diseases Control Programme
ICIPE:	International Centre of Insect Physiology and Ecology	WB:	World Bank
IFPMA:	International Federation of Pharmaceutical Manufacturers' Associations	WHO:	World Health Organization

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ACTION TO ROLL BACK MALARIA – PROMISE FOR PROGRESS

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